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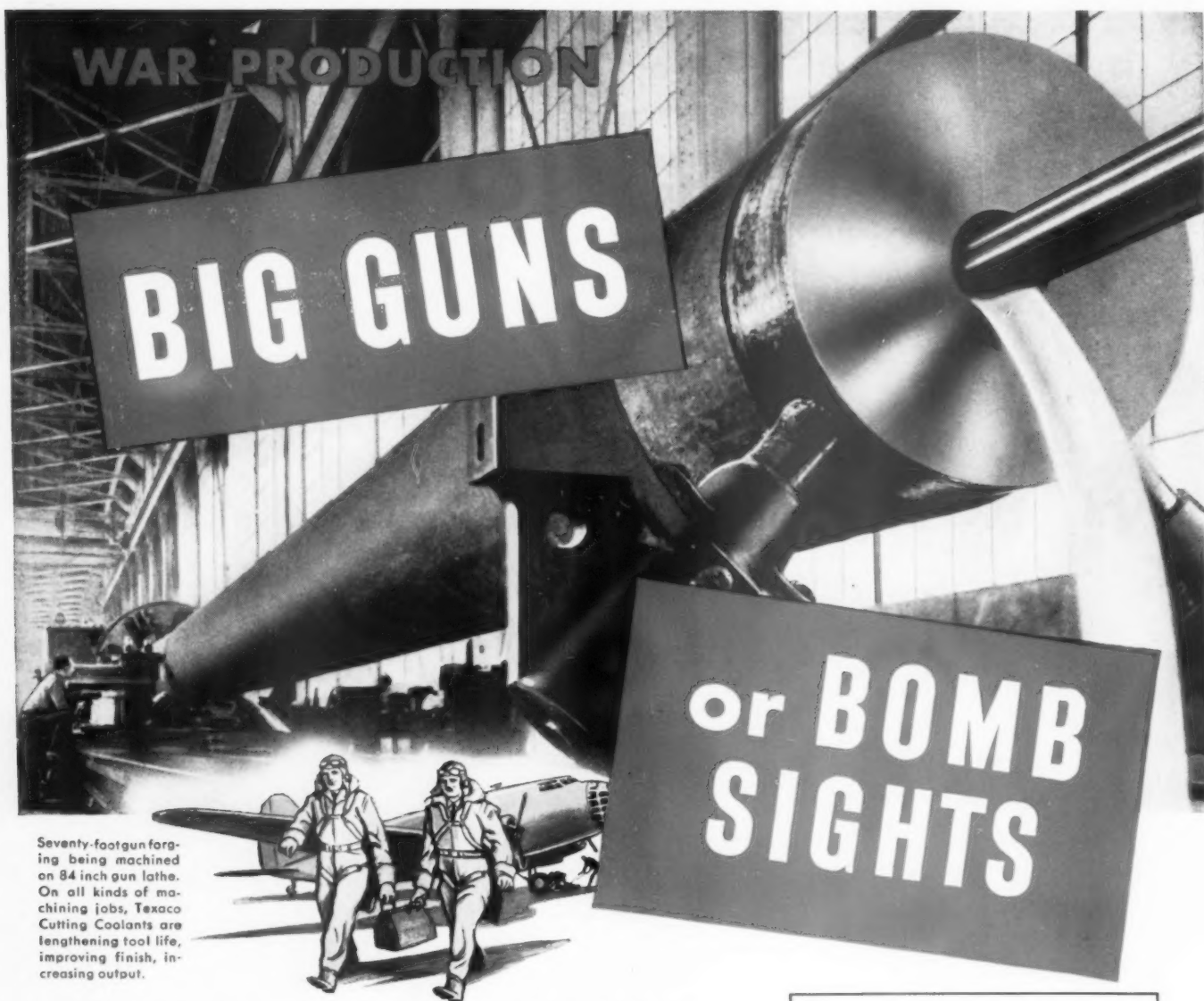
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Seventy-foot gun forging being machined on 84 inch gun lathe. On all kinds of machining jobs, Texaco Cutting Coolants are lengthening tool life, improving finish, increasing output.

EVERYWHERE, production records are falling before American industry's all-out war effort.

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Regardless of types, sizes, makes or models of the equipment *you* operate, trained Texaco Lubrication Engineers will gladly cooperate in increasing output, decreasing down-time for repairs or replacements.

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►► **Question:** What is the safe, quick, economical way to handle a load that is

HEAVY... like a turbine cover?

HIGHLY FINISHED... like a paper mill roll?

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FRAGILE... like a crate of plate glass?

See Answer Below



1



2



3

- 1 Handling big steel mill roll without harming smooth finish.
- 2 Turbine cover is kept level and exactly fitted in place.
- 3 Sling grips glass crate by edges; no hooks, no damage.

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The answer to handling any "problem" load more easily is a Yellow Strand Wire Rope Plaited Safety Sling.* Flexible, light-weight and kink-proof, this patented type will hoist a locomotive or a barrel with equal security. Each sling has the *stamina* of Yellow Strand Wire Rope. Braided by our expert splicers, its exceptional *pliability* enables it to grip a load softly, snugly and without damage to a delicate surface.

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* MURRAY PATENTS: U. S., 1475859, 1524671; CANADIAN, 252874, 258068

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GENERAL ELECTRIC ANNOUNCES NEW FLUORESCENT LIGHTING INVENTION

saving millions of pounds of critical materials within next six months!

New Sequence-Starting Circuit
uses only one ballast for
four 100-watt fluorescent lamps
... increases light output 8%

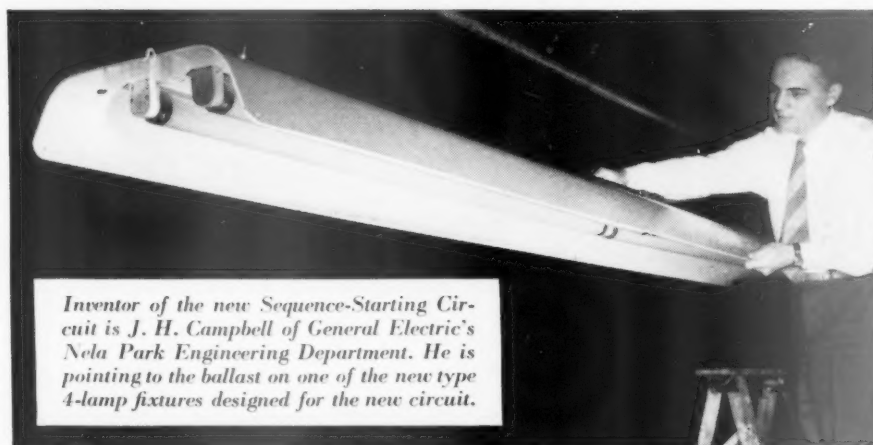
GENERAL ELECTRIC announces a revolutionary new type of fluorescent lighting circuit that can save millions of pounds of critical war materials within the next six months. The new Sequence-Starting Circuit requires only one ballast to operate four 100-watt fluorescent lamps in a single fixture instead of the two ballasts formerly required. Invented by a young Nela Park engineer, J. H. Campbell, and covered by U. S. Patent No. 2,266,619, it is now available for war industries.

Originally developed to save critical materials as an emergency alternative to the inductive method of operating fluorescent lamps, the new Sequence-Starting Circuit has surpassed all expectations.

Advantages of new circuit

- 1 Critical material necessary in ballasts cut approximately in half.
- 2 Cost of ballast equipment reduced 50%.
- 3 An overall reduction in fixture cost of approximately 20%.
- 4 Marked saving in weight.
- 5 Overall light output increased 8% per watt consumed.
- 6 Number of lead connections reduced from 8 to 3.

Although the Sequence-Starting Circuit may be used only on 254, 265 and 277 volt circuits, many new war plants have that voltage available while other plants can be changed



Inventor of the new Sequence-Starting Circuit is J. H. Campbell of General Electric's Nela Park Engineering Department. He is pointing to the ballast on one of the new type 4-lamp fixtures designed for the new circuit.

ed over to take advantage of G.E.'s latest fluorescent development.

Savings Effected

The use of the Sequence-Starting Circuit results in important savings in critical materials. Per 4 lamp fixture these include:

Copper . . . 2.49 pounds.
Iron and steel . . . 8.8 pounds.
Aluminum . . . 0.345 pounds.

That's enough copper to make ten 20mm. cartridge casings . . . enough

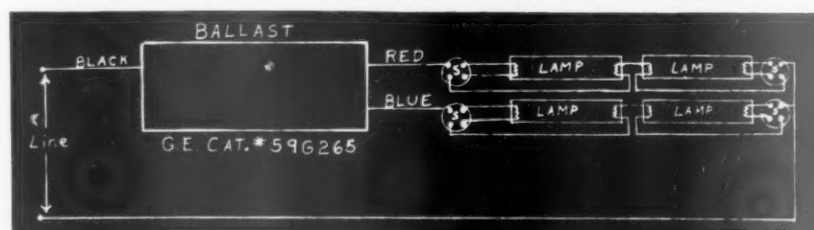
iron and steel to make thirty-five 20mm. shells . . . enough aluminum to make ten fuse primers.

It is estimated that potential savings that may be effected by this new circuit in the next six months are:

Copper . . . 500,000 pounds.
Iron and steel . . . 1,750,000 pounds.
Aluminum . . . 70,000 pounds.

For complete details, see your General Electric lamp division office or write General Electric Co., Dept. 166-P-8, Nela Park, Cleveland, O.

HERE'S HOW THE NEW CIRCUIT WORKS:



The New Sequence-Starting Circuit requires only one ballast to take care of four 100-watt fluorescent lamps operated in series on a 254, 265 and 277 volt A.C. circuit. Each lamp requires one standard FS-74 thermal switch starter. The one split-phase ballast required is covered by U. S. Patent Nos. 2,056,629 and 2,025,471 held by General Electric. Certified by Electrical Testing Laboratories.

G-E MAZDA LAMPS

GENERAL ELECTRIC

Gas Mask Production Increased 250%



Speeding Mosquito Boat Production, this workman drills holes for bolting frames to gussets. The tool is a B & D $\frac{1}{4}$ " Shorty Electric Drill.



"Materially Speeding Production," reports marine equipment maker. "Thanks for help setting up new war-production line. Using B & D Stud-Setters, Nut Runners, Drills, Scruguns. Appreciate prompt repair and parts service."

—with Black & Decker Tools!

THROUGHOUT war industry, Black & Decker Portable Electric Tools are pushing production to new peaks. A time study by a gas mask manufacturer shows: Black & Decker Scruguns cut nut-running time per unit from 15 seconds to a fraction over 4 seconds. Time saving, 73%. Production increase, 250%.

Other busy plants report: "Sheet metal cutting time reduced 75%" . . . "Production up at least 30%" . . . "Screw driving speed increased 20%" . . . Drilling and tapping,

screw driving and nut running, sawing and sheet metal cutting, grinding and sanding . . . these are some of the countless jobs on which Black & Decker's many types of Portable Electric Tools are saving precious hours now.



Expert Help—QUICKLY!

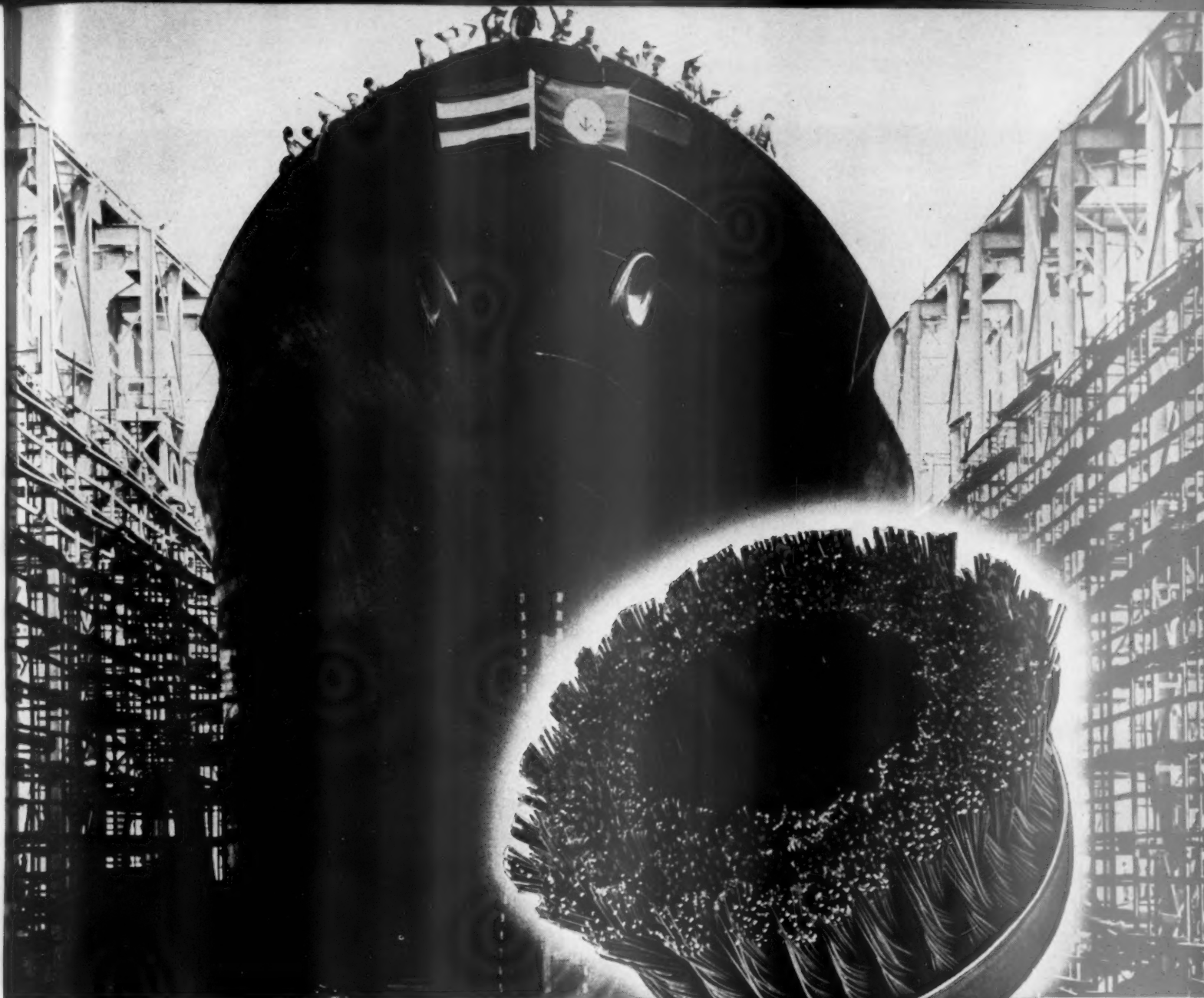
A Black & Decker Distributor suggested the time-saving operation shown above. On any tooling problem, and as a dependable source of supply, phone your nearby Black & Decker Distributor. Or write The Black & Decker Mfg. Co., 764 Pennsylvania Ave., Towson, Maryland.

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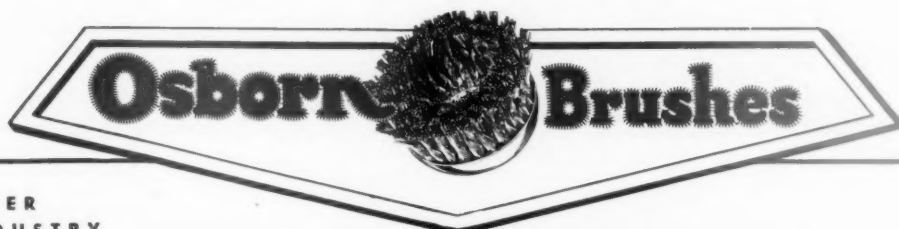
Ships are finished faster when this brush scrubs the steel

● Designed for swift, thorough removal of scale and rust from big steel sections such as ship plate and structurals, this Osborn cup brush is speeding the cleaning of new hulls in virtually every important shipyard in the country.

Rust and scale and welding slag are saboteurs to which every ship is prey. They must be completely eradicated from the entire hull before painting. That's a big job. It cannot be done as swiftly as it must be done unless the fastest, most efficient tools are used.

That's why Osborn power-driven cup brushes—big, husky, and long-lived—are the No. 1 choice for this job in the nation's shipyards today. Osborn's special disc-center design, with a double row of wires held by a knot-type anchor, permits a free brushing action that greatly reduces flexing, fatigue, and breakage of wires. Soundly designed and soundly built, they work faster, last longer.

These Osborn cup brushes scrub down a ship swiftly and thoroughly, removing mill scale and rust from plates and structural members, and slag from welded seams. Like other Osborn power-driven brushes, they're adaptable—they fit all standard power tools, air or electric. Like the rest of the Osborn line, they're proving their quality and value by speeding production of the tools and weapons this country of ours so urgently needs. *The Osborn Manufacturing Company, 5401 Hamilton Ave., Cleveland, Ohio.*



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BASIC ADVANTAGES of the Three Types of Portable Power Tools



Pneumatic Tools

Available for a wider variety of applications than any other type.

Generally of more rugged construction. Cannot be damaged by overloading.

Easily stand up under the hardest kinds of heavy duty service.



Universal Electric Tools

Run on ordinary AC or DC electric current which is available almost everywhere.

Offer a wide range of models for all kinds of production and maintenance. Installation costs generally lowest.



High Frequency Electric Tools

Lowest operating costs for users of ten or more tools.

Maintain virtually constant speed under load.

Nature of high frequency current permits simplified construction for light weight, easy handling, low maintenance.

There are three types of portable power tools — Pneumatic . . . Universal Electric . . . and High Frequency Electric. All three will do your job, but *one* of them will do it best!

Each of the three has construction and service features to fit a particular kind of work. Applied to the job it is best fitted for, one type of portable power tool will out-produce and out-last the others.

Knowing *which* of the three types is best for your work takes expert study. And THOR is especially well qualified to help you decide because;

THOR makes all three types of portable power tools.

THOR has the engineering “know how” that comes from building good tools for nearly fifty years.

THOR is working continuously to make the good tools of today even better tools tomorrow . . . to develop new tools for new applications.

THOR has the trained Service Engineers to put this advisory service into practical operation.

Know that you are getting the utmost peak in production and service out of your portable tools by making sure they are the proper *type* for the job. For further information, without obligation, write Independent Pneumatic Tool Company, 600 W. Jackson Blvd., Chicago, Ill.

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Let Thor help you
get peak production
with the right type of
Portable Power Tools

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☐ **1. BAND SAW & HACK SAW DATA**—A useful wall chart 4½" x 12" giving the recommended saw blade teeth, feed and speed to be used when cutting various types of material. Includes data for power and hand hack saw blades, and band saw blades. A very handy selection chart for use where many different materials are cut. Spartan Saw Works.

☐ **2. WASHFOUNTAINS FOR GROUPS**—An informative book on washroom practise, featuring several types of group washfountains. Goes into great detail about each type, showing photographs and section drawings. Also covers the importance of cleanliness, and the economy of washfountains compared with wash bowls. Standard Washroom Equipment Div., Sugar Beet Products Co.

☐ **3. AIR FILTERS**—An informative booklet covering many types of air filters, their principle of operation, construction and uses. Large photographs and drawings show the features of each type. Also includes specifications and dimensions for all the varieties shown. Staynew Filter Corporation.

☐ **4. HYDRAULIC JACKS**—A 4-page bulletin featuring independent-pump, vertical outside-pump and horizontal out-

side-pump jacks. Photographs and specifications are shown for each type. Bulletin also lists sizes of flexible copper pipe and fittings used with the independent-pump jacks. The Watson-Stillman Company.

☐ **5. ELECTRICAL EQUIPMENT**—The "Quick Selector Catalog" is a 64-page book designed to speed up and simplify the selection of many types of electrical equipment. Subjects covered include safety switches, non-fuse breakers, multi-breakers, panelboards, motor control and motors and similar equipment. Electrical ratings, physical dimensions and circuit diagrams expedite the selection of correct equipment for each purpose. Westinghouse Electric and Mfg. Co.

☐ **6. LATHE OPERATION**—"How to Run a Lathe" is a well prepared 128-page book on the operation and care of metal working lathes. It is very useful for training apprentices and students and as a handy reference book for lathe operators. Covers such subjects as grinding cutter bits, turning, facing, drilling, boring, reaming, tapping and thread cutting. Sample copy free to shop superintendents and apprentice supervisors. Additional copies 25 cents. Please write direct to South Bend Lathe Works, South Bend, Ind. Ask for form LB-41.

☐ **7. WIRE CLOTH**—A very informative, 116-page book full of useful data about all types of wire screen and cloth. Gives a glossary of wire cloth terms, tells how to select the proper grade and how to order it and calculate its weight. Numerous tables and drawings of different meshes make this an invaluable book for any one using this type of product. Many of the tables give useful information on general subjects. Newark Wire Cloth Company.

☐ **8. CHAIN CONVEYOR**—Book full of large photographs features a new type of chain conveyor for production line use. The chain runs completely within a steel tube, and the design is said to eliminate roller turns, corner sprockets and heavy superstructure. Book shows many installations of the conveyor in actual use, and drawings show the construction details of the device. Richard-Wilcox Manufacturing Company.

☐ **9. RESISTOFLEX**—Book discusses the properties and uses of resistoflex PVA, a synthetic resin, which when compounded and processed becomes a tough, strong, flexible, rubber-like material. Book shows how the products are made and gives the specifications of several solvent-proof products, such as hose, transparent tubing, industrial gloves and work aprons. Coating solutions and paints of this product are likewise mentioned. Resistoflex Corporation.

☐ **10. WATER TREATMENT**—"Water Conditioning Systems for Boilers" is an instructive 10-page book explaining how the "technical" system operates and giving a great deal of useful information about the treatment of boiler water. Discusses the causes of foaming, priming, embrittlement, boiler scale and other associated subjects. An informative and concise treatment of a rather involved subject. Water Treatment Company of America.

☐ **11. GAUGES AND DIAL INDICATORS**—A catalog featuring many types of dial indicators, dial micrometers, up-

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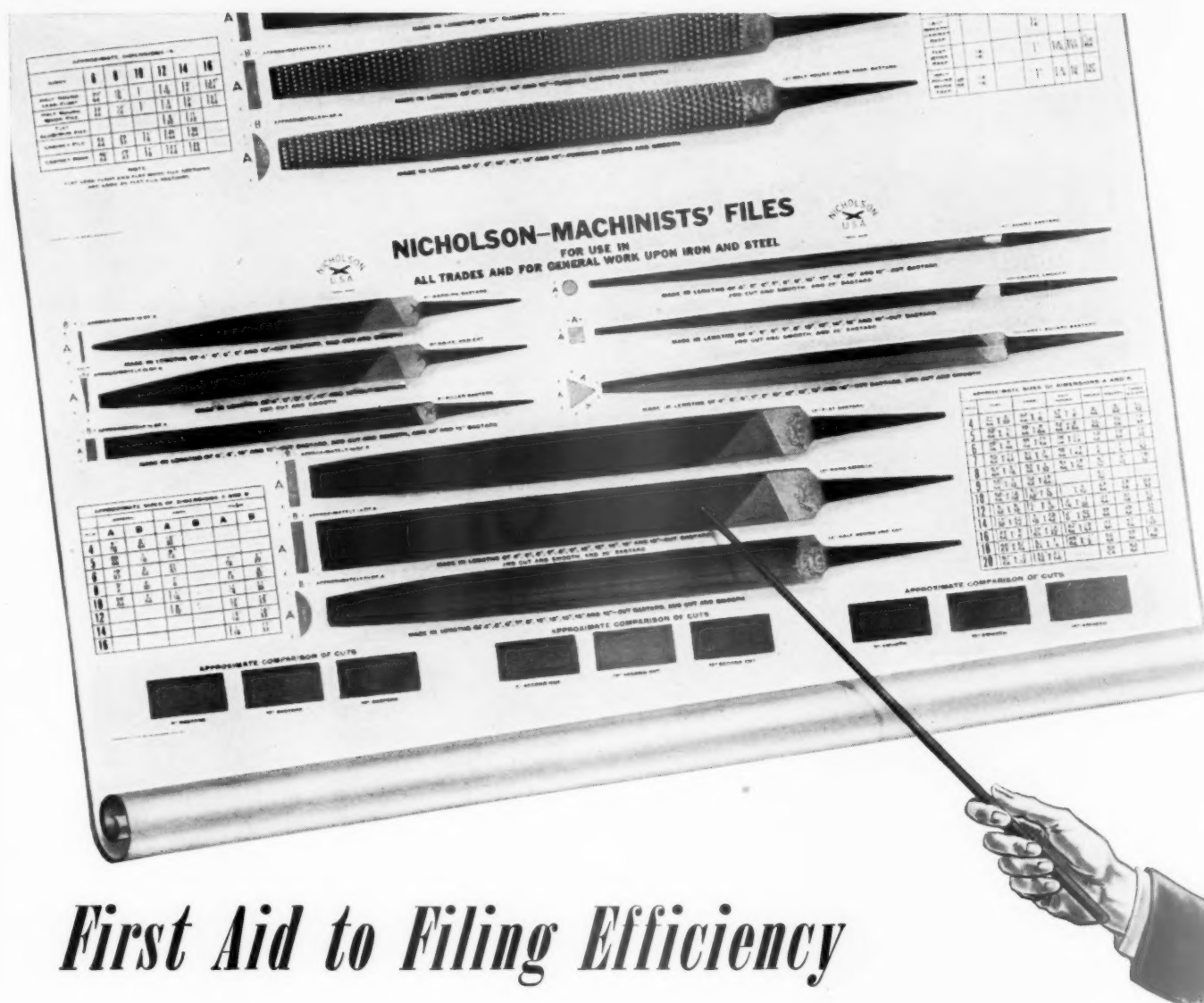
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BESIDES making files of inherently high filing efficiency, Nicholson has developed numerous aids to enable machine-shop managements and workers to *bring out* that efficiency.

The Nicholson Wall Chart — portion of which is reproduced above — is one. In addition to serving as a convenient tool-room guide to *The right file for the job*, so far as shapes, cuts and sizes of the more generally used files are concerned, this Chart constitutes a valuable basis for "classroom" training.

These employee "school" sessions are usually presided over by a shop superintendent or

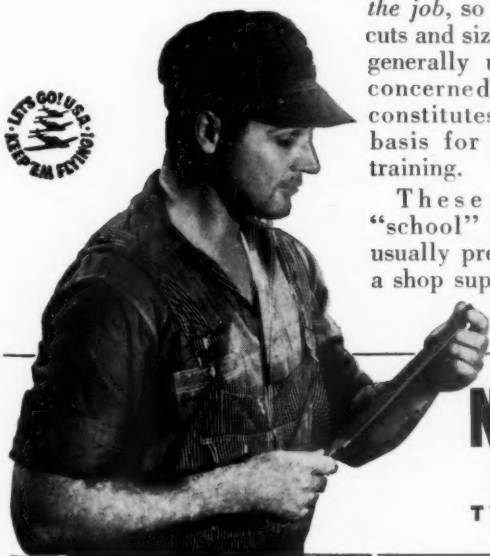
foreman. And from their extensive studies of individual filing problems, Nicholson service engineers themselves have delivered educational talks before such groups.

Elementary literature on filing and technical bulletins on the features and uses of special purpose files are also available.

If you've a training auxiliary or program in which we can be of help with any of the aids indicated above, *write us about it*. For your file needs—and practical help on file purchases — contact your mill-supply house.

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right gauges and cylinder gauges. The wide variety shown and the numerous attachments available, make the book of real value to any one who makes use of these types of products. Large, clear photographs give full construction and scale details. B. C. Ames Company.

☐ **12. SLING CHAINS**—Discusses all types of chain slings, and shows graphically how to calculate safe loads on single and double slings when used under different operating conditions. American Chain & Cable Co.

☐ **13. WELDLESS CHAIN**—Discusses many patterns of weldless chains, including American, Tenso, Twin-Lock, Lock Link, Niagara and Single Jack patterns. Large photographs are given of each style. Also covers accessories, such as toggle bars, S-hooks, round-eyes and special attachments. American Chain Div., American Chain & Cable Co.

☐ **14. INSPECTION GAGES**—Dial inspection gages for shells are treated in a comprehensive book covering all types of gages for cartridge cases, projectiles, primers, fuses, bombs and small arms ammunition. Drawings and photographs are given for each type and show all details of the gage construction. Federal Products Corp.

☐ **15. PYRANOL TRANSFORMERS**—Interesting and colorful book explaining the properties and uses of pyranol and its application in transformers. Large photographs show many of the uses of pyranol transformers. One page, with a large layout drawing describes the load-center distribution system for industrial plants. General Electric Company.

☐ **16. HIGH GRADE PAPER**—An interesting folder fitting in the timely theme of conservation. Paragraphs include don't let the paper situation sabotage your records, common sense policies on record paper procurement and use, use paper and save rubber, what about filler? ash?, and paper . . . the life blood of free enterprise. Byron Weston Company.

☐ **17. CARE OF RUBBER**—Two 8½" x 11" wall charts listing the proper care of rubber products. One deals with rubber hose, the other with fire hose. Designed to guide the user in getting maximum life from his hose. Concise and easy to read. Manhattan Rubber Mfg.

☐ **18. CUTTING OILS**—A very informative book about Gulf cutting oils and containing many large photographs. Most of the book is an instructive section devoted to a machining guide for modern

metals and alloys. This section treats all phases of machining these metals, telling how to shape the tools, proper cutting oil to use and how and the proper method of grinding tools. Charts, drawings and data tables make this section a really useful one on machining practise. Gulf Refining Company.

☐ **19. LATHE DRAWING**—A 22" x 18" blueprint of a lathe, giving all the names of the import parts. A very useful chart to hang in training classrooms and in departments where new lathe hands are being used. Drawing is large enough to show clearly the details of the lathe construction. Note: This chart costs 10 cents. Please send money and order direct to the South Bend Lathe Works, South Bend, Ind. Ask for Blue Print 175.

☐ **20. FIRE EXTINGUISHER CHARTS**—A series of 6½" x 10" charts on heavy card suitable for mounting on wall near fire extinguishers. Charts tell how to use extinguisher, what kind of fires to use it on, and how to properly maintain the equipment. Separate charts suitable for vaporizing liquid type equipment, wet chemical type, foam type, gas cartridge type, and large vaporizing liquid types of extinguishers. A handy series of charts giving all pertinent information about these types of fire extinguishers and their care. Pyrene Manufacturing Co.

☐ **21. UNDERVOLTAGE**—An interesting and colorful book discussing the dangers to production caused by undervoltage. The book tells by text and shows graphically how low voltage lowers illumination and reduces machine performance. Then it shows how this condition can often be corrected easily by means of feeder voltage regulators. A very interesting treatment of plant distribution problems. General Electric Co.

☐ **22. FLOOR MAINTENANCE**—"The Proper Maintenance of Floors" discusses the cleaning, sealing, and waxing of floors, stressing the use of this company's products. A great deal of useful informa-

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ONE OF THE FAMILY OF ARISTOLOY STEELS

To conserve nickel and chromium, all industry is cooperating to limit the use of stainless steels to vital applications where only stainless will do the job. For such applications Copperweld Steel Company is furnishing Aristoloy Stainless steel bars and billets. We'll be glad to discuss your stainless steel applications with your engineering staff.

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tion about the care of all types of floors is included. A 2-page table provides a handyguide for floor maintenance methods as they apply to various kinds of surfaces. West Disinfecting Company.

☐ **23. MANUALLY AND POWER OPERATED CHUCKS**—A 64-page catalog describing a complete line of chucks, with photographs and specifications of each type. Includes independent chucks, geared scroll chucks, special type chucks, two jaw chucks, chuck jaws, planer chucks, drill chucks, and other types. Book is a useful compendium of chuck information and varieties. Union Manufacturing Co.

☐ **24. LEATHER PACKINGS**—A very complete 50-page "Handbook on Hydraulic and Pneumatic Leather Packings". Treats leather packing design and application, with dimensional standards. Discusses the reasons for using leather packings; piston plates and cleanance; bolts, studs and piston rod shoulders for cup packings; leather grip for cup and flange packings; cylinder, plunger and rod surfaces; heel corner radii, lip bevel and flared U and cup packings; springs and expanders; surface speeds at various pressures; temperature limits; and other related subjects. Numerous drawings and

tables simplify the use and value of the book. Chicago Belting Company.

☐ **25. SILVER ALLOY BRAZING**—An 8-page book describes silver alloy brazing of fabricated copper piping. Several drawings aid in the explanation of the text. Contents include the inside feed method, outside feed method, annealing silver alloy brazed copper piping, and many other informative sections—brazing branch outlets, hub flanges, circumferential rings on expansion joints, etc. Handy & Harmon.

☐ **26. DERMATITIS** — An instructive four page folder discussing dermatitis, its causes and prevention in the metal working industry. This subject is of utmost importance in modern industry and this concise treatment gives much pertinent information that should be considered. E. F. Houghton & Company.

☐ **27. COATED ABRASIVES**—"A Lecture Course on Coated Abrasives," for the artisan, mechanic and student, is a 66-page book giving a complete treatment of this subject. Its contents include a description of the natural and artificial abrasives, the backings, adhesives, manufacturing processes, finishing operations, their use in woodworking,

metal working and finishing and other related subjects. The book is full of large photographs, photomicrographs, and shows a useful grading chart. A very timely and instructive book for any one using coated abrasives, or interested in this subject. Behr-Manning Division of Norton Co.

☐ **28. SCREW DIMENSION FINDER**—This "Socket Screw Dimension Finder" gives all the important dimensions of the standard sizes of socket head cap screws, stripper bolts and set screws. The finder is 10" in diameter and is printed in two colors on heavy card stock. Note: This is offered free to industrial men who write on their company letterhead to Parker-Kalon Corp., 200 Varick St., New York.

☐ **29. DATA ABOUT TITANIUM**—"Titanium and Its Use in Steel" is a 116 page book containing a wealth of information about this product. Covers the history of titanium, its properties, its many alloys and their properties and uses. Numerous photographs show the microstructure of the alloys under various conditions. Many tables and charts of useful engineering information are likewise included. The Titanium Alloy Mfg. Co.

☐ **30. ARC WELDING** — A useful "Arc Welding Inspection Chart" for wall mounting. Shows large photographs that compare a properly welded fillet with those improperly welded due to various causes. Also shows rows of faulty weld beads that can be compared with a correctly made row. This is a very instructive and useful chart for any arc welding department. The Lincoln Electric Company.

☐ **31. CONSERVING RUBBER** — "First Aid to Industry in Conserving Rubber" is the title of a comprehensive book telling how to conserve all types of industrial rubber products—belting, hose, packing, insulated cable, mats, etc. The book is well illustrated and is full of good, practical information. U. S. Rubber Company.

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A special message to industries converting to war production



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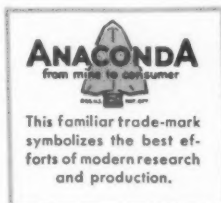
**If You Have Any Magnet Wire and Coil Problems,
or need Increased Production on These Items . . .**

Anaconda Can Help!...

Anaconda's Central West plants still have unfilled capacity on magnet wire and coil production . . . *for war work*. In addition to these facilities, they have experienced personnel to help solve problems you might have with this phase of manufacture.

Here is an opportunity to release your time so that it can be devoted to other important problems. Our sales offices, located in all principal cities, are near you. Call today. A representative will be glad to discuss your problem.

GENERAL OFFICES: 25 Broadway, New York City
CHICAGO OFFICE: 20 North Wacker Drive
Subsidiary of Anaconda Copper Mining Company
Sales Offices in Principal Cities



These Improved Insulations Are Now Available Nylon—Vitrotex—and Formvar

The commercial development of Nylon and Vitrotex insulations is in part the result of Anaconda research . . . research that continues with redoubled effort producing new products for war work. Of course, when peace comes, the benefits of this research will be ready for industry everywhere.

42262



ANACONDA WIRE & CABLE COMPANY

When writing Anaconda Wire & Cable Company please mention Purchasing

GET THIS

"Know-How" Information

USE COUPON BELOW

FOR YOUR PLANT

32. MAINTENANCE NOTEBOOKS—

A very useful and instructive, two-volume set of maintenance rules and suggestions for maintenance men concerned with the care of electrical apparatus in industry. The books total 220 pages and are made up of 15 chapters for loose-leaf insertion in 5 x 7 inch binders. Each chapter is brought up-to-date and additions are made as conditions warrant. Books cover all phases of electrical maintenance and are full of diagrams, charts and tables. Westinghouse Electric & Mfg. Co.

33. LATHE OPERATION—"How to Run a Lathe" is a 128-page booklet full of useful information for any one operating lathes. Contents includes the history and development of the lathe, setting up a lathe, operation of a lathe, lathe tools, measurements, plain turning, chuck work, taper turning and boring, drilling, reaming, tapping, and cutting screw threads. Book is full of drawings, photographs and tables and valuable technical data. Note: Book costs 25 cents. Please send order directly to South Bend Lathe Works, South Bend, Ind.

34. TRANSFORMER COMPONENTS—Presents a complete line of transformers for broadcast, amateur, laboratory and replacement purposes. Likewise covers

such items as chokes, modulation reactors, filters, plug-in audio units, etc. Contains many wiring diagrams of useful circuits, and engineering information, such as decibels vs. voltage and power. United Transformer Company.

35. POWDERED SOAP—"How to Buy Powdered Soap Intelligently" is a 12-page book discussing such subjects as the medical aspects of industrial skin cleaners, what is soap anyhow? types and kinds of soap, "scrubbers", factors bearing on price and economy, and a check chart for checking the properties of the soap being considered. Sugar Beet Products Co.

36. CHUCKS AND BORING HEADS—Describes and illustrates independent lathe chucks, universal lathe chucks, combination chucks, double grip drill chucks and offset boring heads. Large photographs and diagrams show the details of each type. Specifications and prices are listed. Westcott Chuck Co.

37. ROLLING DOORS—Features metal doors of many types—steel rolling doors, "Akbar" fire doors, rolling grilles, fire shutters, vertical sliding doors and many others. A series of sequence sketches shows the many advantages of steel rolling doors, and numerous photo-

graphs show all types of doors and shutters in actual use. Full construction details are given as well as standard dimension tables. The Kinnear Mfg. Co.

38. FLEXIBLE SHAFT TOOLS—Six page folder features light weight flexible shaft tools and their accessories. Several models are shown and prices quoted. Useful for grinding, polishing, slotting, sawing, carving, sanding, cleaning, identification marking, drilling, etching, etc. Diagrams show some of the methods of using the tools. Foredom Electric Co.

39. ALARM SYSTEMS—This 6-page folder features an automatic alarm system applied to industrial protective fences. Explains by text and shows by photographs all the various components of the system and how it operates. Several models with a wide range of flexibility are covered. Full details of the systems and their applications are discussed. Automatic Alarms, Inc.

40. SYNTHETIC RUBBER PARTS—Informative bulletin gives essential data about synthetic rubber molded parts, treating the characteristics of neoprene types, thiokol and butadiene types. Tells when and how to use these parts, and where to get the finished parts. Chicago Belting Co.

41. CORROSION RESISTANT COATING—Bulletin features "Co-Res-Co", a corrosion resistant coating for protecting steel, galvanized iron, aluminum and other metals, brick, wood, and concrete. Photographs show several actual uses of the coating in various industries. Several testimonials are given from outstanding companies. Corrosion Control Corp.

42. HYDRAULIC VISE-PRESS—This 6-page folder features a convenient type of hydraulic vise that is said to be capable of developing pressures of 5 tons between the jaws. It is operated by a 3-pedal foot valve. Large photographs show all the details of the vise and the foot valve, and many of the different ways that the device can be mounted and used. Studebaker Machine Company.

PURCHASING 205 EAST 42ND ST., NEW YORK, N. Y.

Please send me the "Know-How" Information checked.

32 ☐ 33 ☐ 34 ☐ 35 ☐ 36 ☐ 37 ☐ 38 ☐ 39 ☐ 40 ☐ 41 ☐ 42 ☐

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____



SHOOT HOLES in "drilling bottlenecks with **SKILSAW DRILLS!**

● Know why thousands of these SKILDRILLS are on the job in war industries today? Answer's simple — *they drill more holes in less time!*

Light, compact, powerful. They get in tight places *easier* . . . get through tough metals *faster* . . . get all jobs finished *sooner!* That's why you'll find thousands of SKILDRILLS in aircraft, tank and War Production plants . . . making every man and every minute count *for more!*

The features that make SKILDRILLS so superior are typical of the entire line of SKILSAW DRILLS . . . 23 models designed for every job from fastest production drilling to heaviest boring and reaming. Ask your distributor for a demonstration of SKILSAW DRILLS . . . *today!*

SKILSAW, INC.

4761 Winnemac Avenue, Chicago

New York	•	Boston	•	Buffalo	•	Philadelphia	•	Cleveland
Detroit	•	Indianapolis	•	St. Louis	•	Kansas City	•	Atlanta
New Orleans	•	Dallas	•	Los Angeles	•	Oakland	•	Seattle
								Toronto, Can.

SKILSAW PORTABLE ELECTRIC TOOLS

★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

When writing SkilSaw, Inc. please mention Purchasing



1/2 in. SKILDRILL

Only 11 1/2 in. long. Weighs only 8 lbs. 100% Anti-Friction Bearing Construction. Powerful Universal Motor.



Tapping a rubber tree in Malaya. The latex flows along the cut and into the cup. Courtesy of United States Rubber Company.

Rubber?

Let's Look Ahead!

MODERN chemistry has already evolved replacements which may *completely supersede rubber*.

NATIONAL's laboratories have developed adhesives which are successfully doing the work of latex and rubber cement in many industries — thus helping, in a small way, to ease the present shortage. We mention this as typifying what our chemists and research engineers are doing in meeting new problems which are arising almost daily.

The changing picture has undoubtedly affected *your* adhesive requirements in one way or another. If you will tell us the facts, we should be able to be of timely service.

NATIONAL ADHESIVES

DIVISION OF

NATIONAL STARCH PRODUCTS Inc.

820 GREENWICH ST., NEW YORK—CHICAGO—PHILADELPHIA—BOSTON—SAN FRANCISCO—and All Principal Cities

When writing National Starch Products Inc. please mention Purchasing



87% OF OUR TIN IMPORTS TEMPORARILY CUT OFF!



Until the Allied colors wave again over the Malays and the Dutch East Indies, we all have to conserve our tin supplies.

For this reason we developed

"REX" BABBITT METAL

with the maximum 12% tin content limited by government regulations. Every bar is backed by our 68 years' experience in the development and manufacture of dependable Babbitt metals.

For most purposes, REX will do a very creditable job as a substitute for high tin base Babbitt, provided the lining is properly applied and the bearings are carefully fitted and lubricated. Try it!



Proudly the "E" Pennant waves over our plant, awarded to us and our fellow workers by the U. S. Navy for the production of naval ordnance.

The Physical Properties of REX BABBITT METAL

Tensile strength (lbs. per sq. in.)	8,200
% Elongation in 2"	1.2
Red in area %	1.8
Compressive strength (lbs. per sq. in.)	17,500
Specific gravity	9.60
Brinell hardness	25.0
Proper pouring temperature Drg. F.	625°-675°

NATIONAL BEARING

METALS CORPORATION

ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

When writing National Bearing Metals Corporation please mention Purchasing

Great Bombers on Little Casters Grow!



IT'S A NEW IDEA... FROM NOSE TO TAIL BASSICKS HELP ROLL OUT THE B-24'S

Putting thousands of pounds of fighting fury together (and doing it *fast*) is what's going on here—the rapid and mobile assembly of a Consolidated B-24 . . . first bomber in history to actually *roll* off an assembly line.

Practically every part of these mammoth Land Bombers is assembled on easy-rolling Bassicks. Fuselage, Nose and Wing Sections are wheeled into production—on Bassicks.

Work Platforms, Stepladders,

Equipment Shelves and Testing Units travel right with the job—all on Bassicks.

It's the new idea in plane assembly—an idea that is helping Consolidated Aircraft Corporation hatch out B-24 Bombers and Coronado Flying Battleships faster than you'd guess!

Maybe it would speed up *your* production. Whatever you make—if it has to be moved—get it going faster and easier on Bassick Casters.

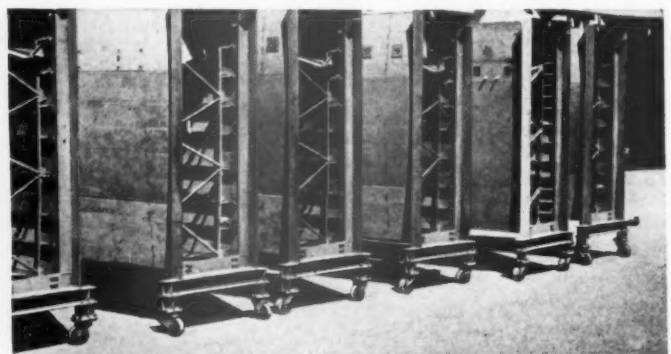


WORK PLATFORMS, which surround the big bombers, roll on Bassick Casters as they move down the assembly line. Shown above: worker attaching Bassick Caster to plate.



TESTING EQUIPMENT (above) for checking the Bombers rolls right up to the job on Bassick Casters.

SHOWN BELOW: B-24 Fuselage on its way into the production line on easy-rolling Bassicks.



CENTER WING SECTIONS of Consolidated Coronado Flying Battleships (here shown on their sides) are rolled right up to the assembly line on Bassick Casters.

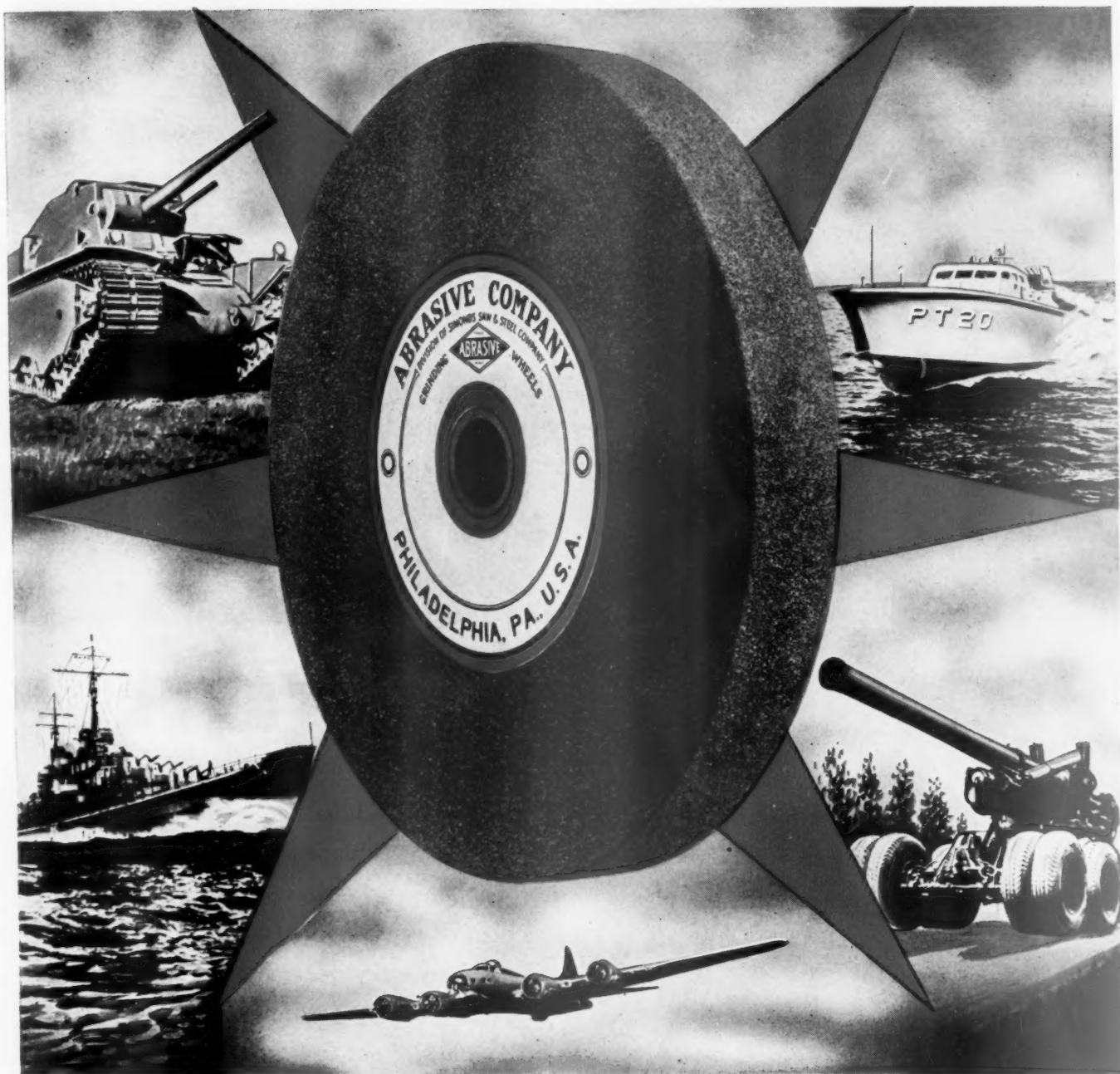


BASSICK CASTERS

THE BASSICK COMPANY... BRIDGEPORT, CONN.

WORLD'S LARGEST MANUFACTURERS OF CASTERS

When writing The Bassick Company please mention Purchasing



Production speeds Victory! Speed production with

ABRASIVE COMPANY GRINDING WHEELS



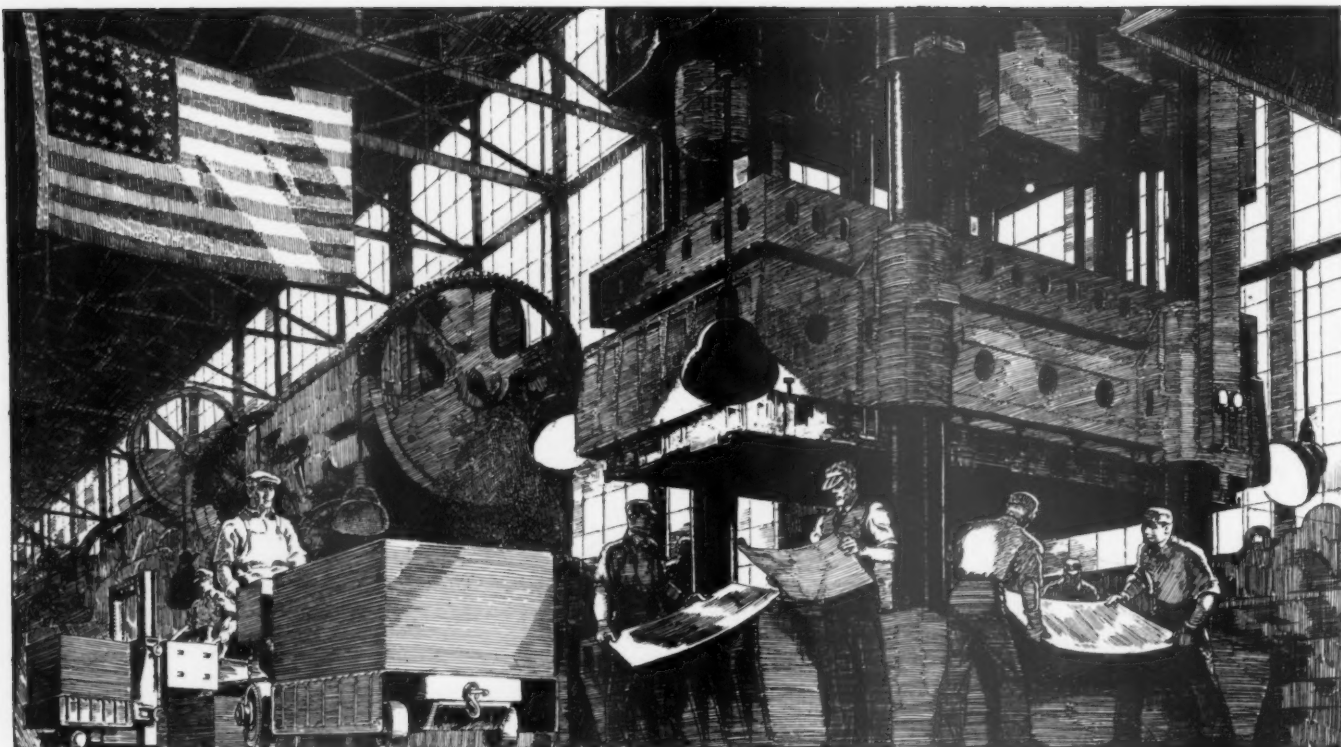
1892 FIFTY YEARS OF SERVICE TO INDUSTRY 1942

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

When writing Abrasive Company please mention Purchasing



THE ANSWER

THE question of war has only two answers. Win or lose. Every man may express his answer as he pleases but the sum of all the answers is the same. Win or lose.

Here's the way we've expressed ours. Long before Pearl Harbor we started converting and enlarging our plant facilities to make war materials for our fighting forces on a mass production basis. Long before Pearl Harbor we were working 24 hours a day, seven days a week turning out these vitally

important assemblies. There have been no strikes, no shut-downs. As our War Production program has progressed our men have become steadily more efficient at their new jobs, and the man-hours per unit have dropped accordingly. They're out to beat the present figures and they will. We have deep confidence in what our fellow Americans are doing. As for us, we've been handed a challenge. We've been dared to do a job that some slant-eyed orientals thought we couldn't do. We're doing it. That's our answer.

AMERICAN CENTRAL
MANUFACTURING CORPORATION

C O N N E R S V I L L E • I N D I A N A

When writing American Central Manufacturing Corporation please mention Purchasing



For Distinguished Service

ARMY DISTINGUISHED SERVICE CROSS
second most important medal given to U.S.
soldiers is awarded by the President in
time of war for extraordinary heroism in
connection with military operations against
an armed enemy of the United States.

WAR'S WOODEN SINEWS!

With bomb, and tank, and plane, and ship needing every available pound of steel, wood constructions of many types are proving a practical means of saving precious metal, time and labor.

Millions of Wasmer Tru-Fit carriage, machine and lag bolts as well as cap and set screws, etc., have been inducted into military service . . . and Wasmer workers are justifiably proud of the speed with which they are turning out this vast production, as well as of the high standards of excellence, precision and strength of these Wasmer Tru-Fit products.



WASMER
BOLT & SCREW CORP.

13600 ATHENS AVE.

CLEVELAND, OHIO, U. S. A.

When writing Wasmer Bolt & Screw Corp. please mention Purchasing

NEED MOTORS

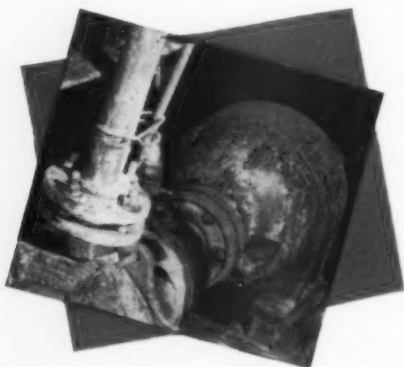
4 things to do



use standard, open, sleeve-bearing motors whenever possible . .

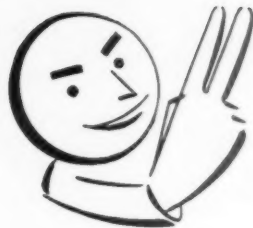
The standard Tri-Clad motor, though classed as an "open" motor, is so well protected that it gives good service on many jobs for which specially protected motors previously were recommended. (See below.)

Sleeve-bearing motors often can be supplied more readily than ball-bearing types because of the present demand for ball bearings on other war equipment. Use ball-bearing motors only on applications where load or mounting conditions definitely require them.



Special end shields and other modifications may result in delay for you and others doing war work.

Consider the use of standard or multi-speed a-c motors in place of d-c wherever this alternative is possible.



order motors early . . giving complete specifications . .

Place motor orders when you order the machines they are to drive.

If you are planning motor drives for conveyors or other equipment for new plants, place orders as soon as design work indicates the motor requirements.

Avoid delay and "mix-ups" by giving complete specifications as shown in table below, preferably on an order form which your G-E motor representative can supply.

MOTORS											
Quantity	Type	Frame	HP	Spec.	Voltage	Current	Phase	Speed	Flux	Excitation & Motor Description	Price
CONTROL CABLE OR ADDITIONAL EQUIPMENT DESIRED											
Quantity	See or Model No.										Price
Shipment Required											

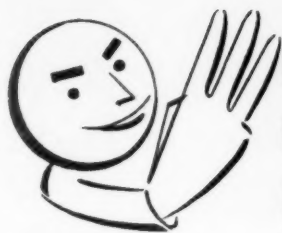


Tri-Clad motors are available in a full range of sizes from 1 to 100 hp. Your General Electric representative can supply complete information, and help you get the Tri-Clad motor to do your job. General Electric Co., Schenectady, N. Y.

**YOUR AID ON THESE 4 POINTS
WILL HELP US PRODUCE AND DELIVER
MORE MOTORS**

YOUR CHOICE OF G-E **TRI-CLAD** MOTORS WILL GIVE YOU
EXTRA PROTECTION AGAINST (1) PHYSICAL DAMAGE, (2) ELECTRICAL BREAKDOWN, (3) OPERATING WEAR.

for WAR WORK? to get them quicker



**give complete
priority information
properly endorsed..**

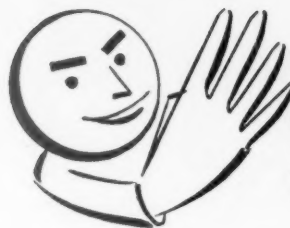
The filling of many motor orders is delayed because of incomplete priority information. If in doubt about details, call your local G-E office.

When placing orders for motors, be sure that complete priority data accompanies *each order* in the form of certificates, endorsements properly signed, etc. The priority is not effective in scheduling shipment until received by your supplier.



Your needs and the war effort are best served by using the proper priority rating as assigned by the War Production Board for the job involved and requesting delivery no earlier than actually required.

Builders of motor-equipped machines for subsequent sale may order their requirements in advance under the Production Requirements Plan.



**check with G. E. for
delivery from local
warehouse stocks..**

To meet urgent war needs, a supply of standard Tri-Clad motors is maintained at G-E factories and local G-E warehouses. Perhaps the motor you want, or can use with a few simple changes, is available for immediate shipment.



Your local G-E motor representative can furnish information on motors which may be in stock in the following cities:

Atlanta, Ga.
Boston, Mass.
Buffalo, N. Y.
Charleston, W. Va.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Dallas, Texas
Davenport, Iowa
Denver, Colo.
Detroit, Mich.
Houston, Texas
Kansas City, Mo.

Los Angeles, Calif.
Milwaukee, Wis.
Minneapolis, Minn.
New York, N. Y.
Oklahoma City, Okla.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.



General Electric and its employees
are proud of the Navy award of
Excellence made to its Erie Works for
the manufacture of naval ordnance.

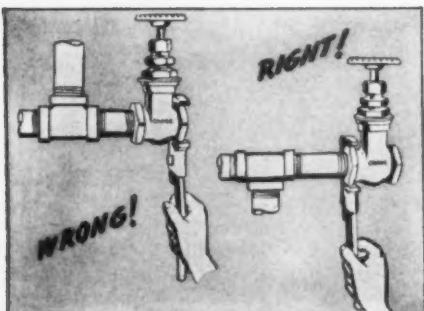
Specify **TRI-CLAD** *Motors*

GENERAL  **ELECTRIC**



HELP FOR FIGHTERS ON THE *Home Front*

You and they have two big jobs—(1) meeting the gigantic demands of war production, (2) keeping your plant in shape to meet those demands. That means proper maintenance—with a capital "M"! Long before Pearl Harbor, Crane Co. saw this need, and inaugurated "Piping Pointers"—to help you and them do the job. Today, these Crane bulletins on better installation and care of piping are training new workers and spreading the gospel of proper maintenance—for peak production, for conservation of critical materials—for Victory! These examples show how they're doing it.



TREAT PIPING RIGHT is rule No. 1 in making present valves and fittings last longer—give maximum service. In "Piping Pointers," Crane tells maintenance men exactly how to do it—how to avoid little careless habits that shorten the life of equipment—how to prevent replacements now when replacements are harder to get.



PICKING THE RIGHT VALVES for specific services is a sure way to eliminate interruptions and delays in production lines. "Piping Pointers" give clear directions on valve selection. Workers using this service know when, where, and why to install gate valves—when to choose globe, angle or check valves.



FOR TRAINEES OR VETERANS—Men who never handled a wrench before quickly grasp the *do's and don'ts* and *rights and wrongs* in "Piping Pointers." They keep veterans up-to-date on "*kinks*" that speed up work and step up efficiency of piping. For plants using this Crane service, it means fewer shutdowns—*more production!*

FREE—TO ANY PLANT—TO HELP SPEED VICTORY! Your local Crane Representative will gladly supply "Piping Pointers" on request. Or, write to the address given here.

CRANE

CRANE CO., GENERAL OFFICES: 836 SOUTH MICHIGAN AVENUE, CHICAGO
VALVES • FITTINGS • PIPE • PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

When writing Crane Co. please mention Purchasing

2 TO 5 TIMES
MORE PRODUCTION
PER MAN PER MACHINE



Now! Grind hard tool steels with ease; also soft materials with less loading. Speed up 2 to 5 times!

"DID I GAMBLE?"...

I'm asking myself (and you) a question. I "risked" a test of Por-os-way grinding wheels to grind $\frac{1}{2}$ " lands in 10 D.P. high speed steel milling cutters for herringbone gears. Unlike previous wheel, found that Por-os-way required dressing only between rough and finish cuts, held its corners, cut freely. Installed Por-os-way with much faster results—and better. **Did I Gamble?**



*Copyright 1942, A. P. DE SANNO & SON, INC.

EXAMINE THE STRUCTURE of this new precision grinding wheel. It's not compact, but cellular and *porous*—something like a sponge!

Properly used Por-os-way takes deeper cuts. It breezes through .010" or more. It grinds 100% to 400% faster. It increases production per man, per machine, 2 to 5 times, practically ends "burning." Por-os-way's unique structure makes possible these results. Air cells surround and cool each grinding point between contacts.

Use Por-os-way on hard steels and alloys. Use it also on softer materials: copper, aluminum, tin, wood, plastics. Por-os-way holds the corner with very little dressing, due to the new vitrified bond. On softer materials, loading is reduced surprisingly. Por-os-way is more free cutting.

See this wheel. Try it. Prove on your own machines the new grinding speed now possible. Ask for a "proof test" demonstration! A. P. DE SANNO & SON, INC., 438 Wheatland St., PHOENIXVILLE, PA.

POR-OS-WAY* a new **RADIAC*** PRODUCT



Below **DECKS**

THERE are not many valves in the Gun Stations and Fighting Tops of America's Warships. But below decks, where the engines stay, there are valves by the hundreds. That they perform their functions dependably and well is as essential as is the performance of many another piece of equipment more easily seen, more often mentioned.

So it is in power plants, refineries, powder plants, chemical industries. Each depends on the precise control of the flow of liquids and gases for proper performance. Each depends on valves for this control.

It is small wonder that in time of war, when every ship must sail, when every factory must produce to the limit, that Powell Valves are in such great demand. For Powell Valves are backed by a century of experience, and a proud record of performance. Powell Engineers are trained to anticipate the demands of Industry. In times of peace this service has been a boon to American Industrial Progress. In times of war it is an essential military requirement.

The winning of a war takes a lot that does not show on the surface. Some of this, particularly valve control, is "below decks."

The Wm. Powell Company
Cincinnati, Ohio

Figure 1793—An Iron Body Bronze Mounted Gate Valve designed and built by Powell to meet Industry's demand for dependable, trouble-free, long-life flow control. Has flanged ends, outside screw rising stem, bolted flanged yoke, bronze renewable seat rings and taper wedge solid disc. Sizes 2" to 30". Also available with taper wedge double discs (Fig. 1444), in sizes 2" to 12". Detail on request.



POWELL VALVES

When writing The Wm. Powell Company please mention Purchasing

ARMOUR'S ELECTROCOATED ALUNDUM

**Helps Meet Tough
Production Schedules!**



TO meet the stepped-up tempo of today's production schedules, *faster tools* are required . . . tools that will do their jobs *accurately — uniformly — dependably*. Armour's Electrocoated Alundum is just such a tool! A sharp, clean-cutting, fast-cutting abrasive that gives longer wear and finer results — Electrocoated Alundum answers every need in metal finishing work.

Economy Rolls and Sheets!

Electrocoated Alundum comes in the handy fifty-yard Economy Roll...and is also available in 9 inch x 11 inch sheets. Whichever form you specify, you'll find that Armour's Electro-



coated Alundum will give superior performance always!

Let Our Abrasives Experts Help You!

Armour has skilled Technical Counselors who will gladly assist you in insuring the best possible application of abrasives to your production work. Ask your Supply Dealer or write direct.

★ ★ ★

Armour's Electrocoated Alundum (aluminum oxide) is made by a patented electrostatic process in which each abrasive grain is firmly embedded on end in glue applied to the backing. The electrostatic process also arranges the abrasive grains at equal minute distances apart—insuring long wear and even cutting.



ARMOUR SAND- PAPER WORKS

Division of
ARMOUR AND COMPANY • CHICAGO

Quick service from branches in

Boston	New York	Buffalo	Philadelphia
Milwaukee	Detroit	Pittsburgh	
Cleveland	Indianapolis	St. Louis	
San Francisco	Los Angeles		
Seattle	High Point, N. C.	Cincinnati	

When writing Armour Sandpaper Works please mention Purchasing



T-04

TUNGSTEN-TITANIUM CARBIDE

**THE NEAREST APPROACH IN TOUGHNESS AND STRENGTH
TO HIGH SPEED STEEL YET DEVELOPED IN A CARBIDE**

EASY TO GRIND—Firthite T-04 will take a keen, smooth edge and can be ground to steep rakes and clearances with deep chip-curling grooves.

UNIQUE—Firthite "GRADE T-04" Tungsten-Titanium Carbide is a Firth-Sterling development—the result of years of research. It sets new performance standards. T-04 is especially recommended for heavy duty, interrupted cuts, coarse feeds, etc.

UNIVERSAL IN APPLICATION—Firthite T-04 is the closest known approach to a **universal grade** of carbide. It approximates high-speed steel in **toughness** and **strength**. Production records show that T-04 gives uniformly fine performance in such varied applications as cutting armor plate, roughing softer steels, machining both cast iron and chilled cast iron—also other metals.

WHATEVER you are machining, use **FIRTHITE**. It's aces! Besides T-04, other grades of Firthite Tungsten-Titanium Carbide are available and will likewise **SAVE YOU MONEY**. They cover the entire field of Steel Cutting with maximum efficiency. **GRADE TA** is for general use on certain steels.

WILL STAND ABUSE—Firthite T-04 is tough, strong, wear-resistant. It withstands abuse from intermittent cuts, old machines, excessive overhang, inexperienced operators, etc.

GOOD FOR INEXPERIENCED TRAINEES—Because Firthite T-04 does not require extra care in operation, it is the logical choice for training new operators in the use of sintered carbides. It is also ideal for any new application.

CONTAINS TITANIUM—The **Titanium** ingredient in T-04's composition plays a triple role: (1) converts an otherwise ordinary tungsten-carbide grade into a star performer in cutting steel; (2) lowers the price to you; (3) precludes any possible shortage, since **Titanium** is the ninth most plentiful mineral and the domestic supply is more than ample for ALL requirements.

GRADE T-16 is for light, rapid finishing of harder steels.

REMEMBER—a pound of Tungsten used in **FIRTHITE** does many, many times the work of a pound of Tungsten used in high-speed steel.

TOOL STEELS AND
CARBIDES FOR COMPLETE
SHOP TOOLING

Firth-Sterling
STEEL COMPANY

OFFICES: McKEESPORT, PA. NEW YORK HARTFORD LOS ANGELES CLEVELAND CHICAGO PHILADELPHIA DAYTON DETROIT

YOUR BEST BET

FOR





UNCONDITIONAL GUARANTEE
If this Housing ever Breaks or Distorts we will replace it Free
THE RIDGE TOOL CO.
ELYRIA, O.

If this Housing ever Breaks or Distorts we will replace it Free.

SPIN IT TO SIZE

RIDGID
is guaranteed to save you
TIME and WORK
and repair expense...

Ask any of the millions of **RIDGID** Pipe Wrench users — they'll tell you these tools are practically never out of service... no lay-up for housing repairs, no expense, no delays. And so much easier to use. Quick-gripping sure-grip chrome molybdenum jaws, heel-jaw replaceable, hook-jaw with handy pipe scale. Adjusting nut in open housing spins easily to size. Strong I-beam handle, easy to the hand. Sizes 6" to 60". At your Supply House.



All **RIDGID** Pipe Tools are sold through Supply Houses

RIDGID is made also in End Pattern, 6" to 36", for pipe against flat surfaces, in tight places.

RIDGID

Pipe Wrenches, Cutters, Threaders, Vises

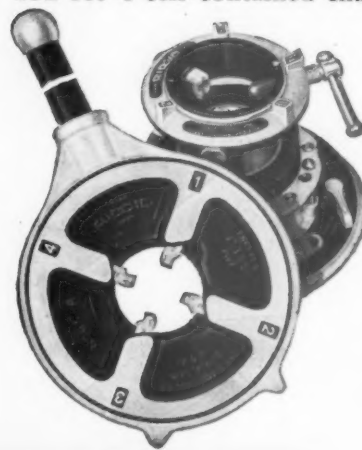
Work-Saver Tools for America's Big Job in 1942

When writing The Ridge Tool Company please mention Purchasing



BETTER THREADS
more easily...quickly...
with this remarkable work-saver **RIDGID** No. 65R

Modern designing gives you this fighting tool for the battle against delays, expense and overwork... You set the workholder with a turn of the cam plate that clicks instantly to size — only one screw to tighten. You set 4 self-contained chasers (instead of 16) to



size in 10 seconds, to thread either 1", 1 1/4", 1 1/2" or 2" pipe — and you cut smooth perfect threads with an easy floating action; your little finger can do it. Durable? This 65R is made of rugged steel and malleable, the chaser dies of long wearing high speed steel. Ask for it at your Supply House.

THE RIDGE TOOL COMPANY
ELYRIA, OHIO, U.S.A.

Tanks are Forgings

Tough, stress resistant forgings—parts that must withstand the most grueling punishment and service abuse—are essential in large quantities for the light, medium and heavy tanks now in production.

Because of the wider use of forgings, American-made tanks excel. They are faster, superior fighters, better able to withstand and "dish-out" blitz warfare.

Beating plow-shares into swords, making forgings for tank transmissions, engines, crawlers, guns and other operating parts is our daily job.

Ever more rough and finished parts of this type flow from under our hammers as the tempo of war production in our shops increases.

While our facilities today are heavily taxed, we still have the desire and the ability to serve more builders of tanks, ships, planes, guns, machine tools and ordnance.

A quick termination of totalitarian ambitions will speed the day when free men can follow normal pursuits. We are doing our part to help speed that day.



Proudly we fly the Navy "E" flag awarded for excellence and proficiency in the production of Naval Materiel.

KROPP FORGE COMPANY

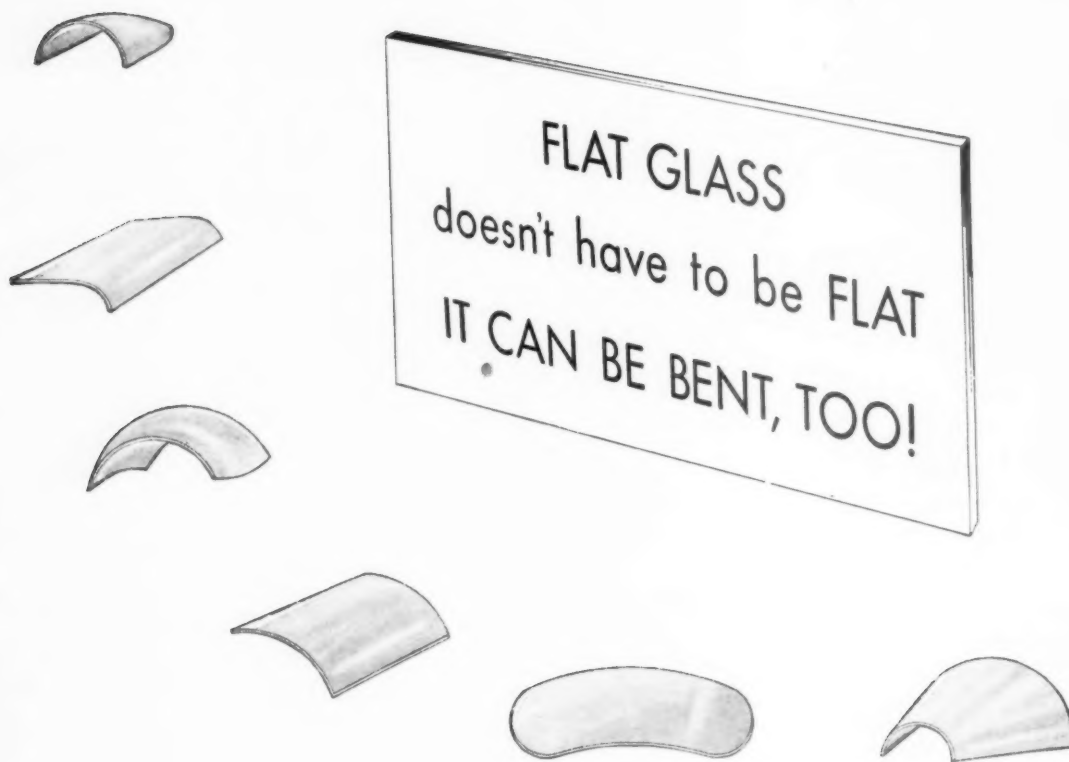
Makers of Drop, Upset and Hammer Forgings for Guns, Planes, Tanks, Ships, Ordnance and Machine Tools

"World's Largest Job Forging Shop"

5301 W. ROOSEVELT ROAD, CHICAGO, ILL.

Representatives in Principal Cities





MAYBE you've never thought of glass as a material that could be bent. But it can be.

For many years Libbey-Owens-Ford has been bending and shaping all types of flat glass products for display windows, showcases, casket tops, store fronts, motorcars, buses, trains, airplanes, and scores of other uses.

And now Libbey-Owens-Ford has perfected new methods of bending glass into shapes never before thought possible . . . "S" bends, cylindrical, conical and double bends. These modern miracles of glass shaping are the more remarkable when it is considered that while plate glass is being bent to previously unheard of shapes, the finished products still retain the flatness of field and the ground and polished surfaces for which polished plate glass is famous. These modern manufacturing methods may open the way for an entirely new use of glass in your product.

Just consider these facts about glass

It has many qualities not found in combination in any other material. It can be made transparent, translucent or opaque. It can be polished or coated. Its surfaces are enduring and acid resisting. It is a non-conductor of electricity. It can be made strong, highly resistant to impact, and to thermal shock. It can be color-clear or colorful. And it has a wide range of other physical and chemical properties that fit it for use for many special purposes.

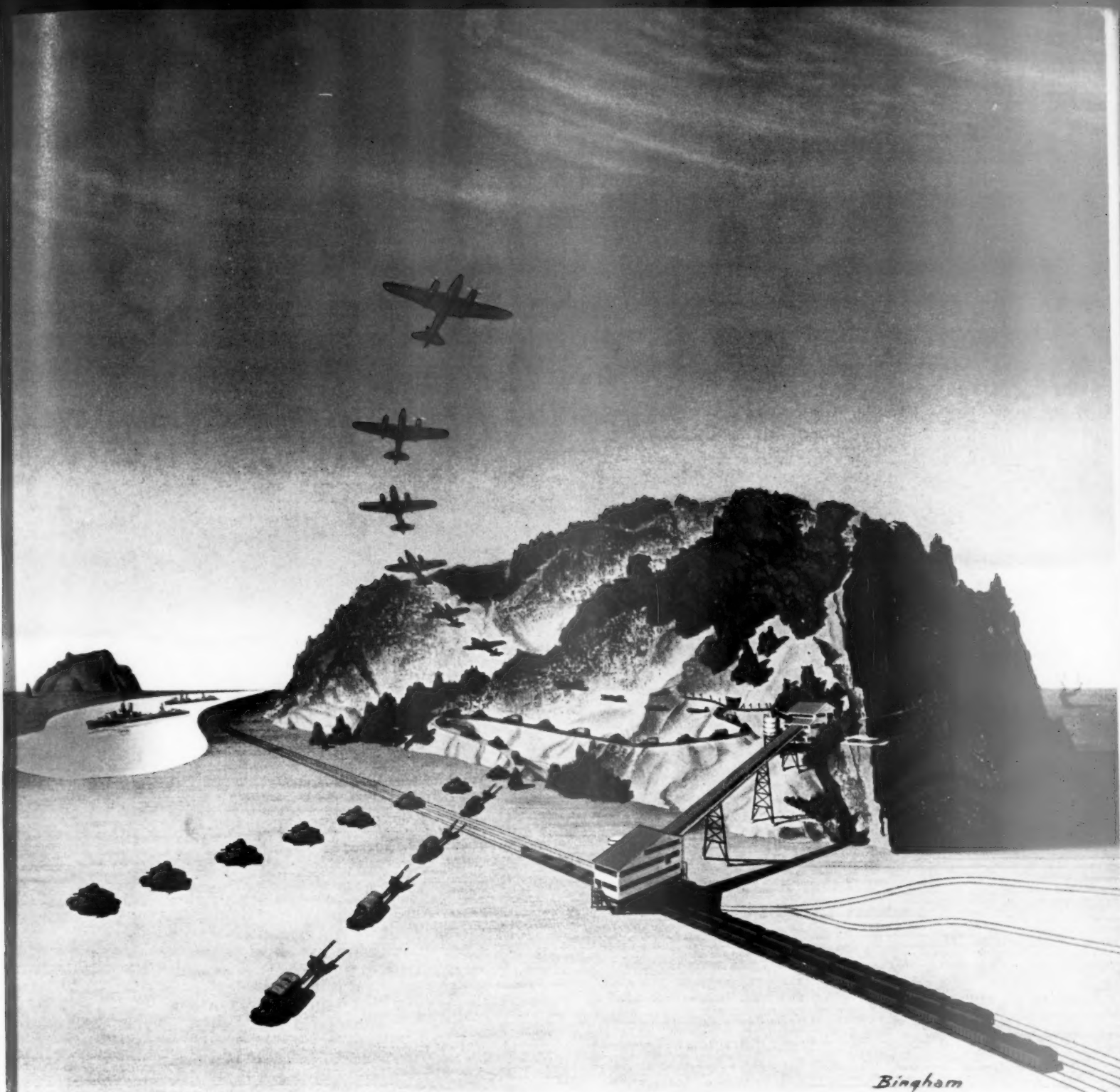
Chances are, that from the complete line of Libbey-Owens-Ford flat glass products there is a glass that will meet your requirements. If not, Libbey-Owens-Ford research is at your service, ready and willing to work on your problem. Libbey-Owens-Ford Glass Company, 1379 Nicholas Building, Toledo, Ohio.



LIBBEY • OWENS • FORD

QUALITY *Flat Glass* PRODUCTS

When writing Libbey-Owens-Ford Glass Company please mention Purchasing



Ships, planes, guns, tanks start in a coal mine

This is a war of machines and armaments, and vast quantities of power are required to build them. Despite all the other forms of energy, 60% of all horse-power required by American industry comes from coal.

Our whole civilization is based on coal, and our whole defense of that civilization is based on it. Coal provides heat. Gasoline can be made from coal. Rubber is about to be made from it. Many vitamins are coming from coal's derivatives.

Coke made from coal is indispensable to steel. Railroads consume one out of every five tons mined. Dozens of vital industries look to it for one or more of the 150,000 chemical compounds already identified through coal carbonization.

Koppers builds most of the coke ovens which carbonize millions of tons of coal . . . is an important producer of chemicals for war . . . of anti-aircraft gun mounts, airplane catapults . . . airplane, submarine,

diesel and automobile piston rings . . . Fast's Couplings for power transmission . . . pressure-cresoted timber, ties and piling . . . and dozens of other products. Koppers Company, Pittsburgh, Pa.

Buy United States
War Bonds and Stamps

KOPPERS
THE INDUSTRY THAT SERVES ALL INDUSTRY

Workers in our Bartlett Hayward Division are now privileged to wear the Navy "E" emblem

WHICH WHEEL?
means an *Extra* plane?

The grinding wheel may control the air.
Precision results from grinding.
Your grinder production may be increased by a better grinding wheel selection.
Another part turned out each hour may mean another bomber.
Norton Abrasive Engineers know the best high productive methods. They're available.

★ ★ ★ **NORTON ABRASIVES**

NORTON COMPANY, WORCESTER, MASS.
BEHR-MANNING DIVISION, TROY, N. Y.

When writing Norton Company please mention Purchasing

THE **RIGHT** PEGS IN THE **RIGHT** HOLES



TODAY'S *No. 1 Problem* IN WAR PRODUCTION

● During the first days in school, our little boys and girls are earnestly fitting pegs and blocks into the holes *where they belong*. It's one of their earliest problems in school life.

Today, in Washington, the nation's key production men are engaged in a grim and all-important version of this same basic problem. Theirs is the gigantic task of *fitting the complicated pegs* of America's industrial and material resources into the largest war production program the world has ever known.

Into this complex problem, The Sisalkraft Co. has found the places where its products fit.

For over twenty years The Sisalkraft Co. has led in the development and production of reenforced, waterproof papers. For over twenty years, FIBREEN has been wrapping and protecting goods and materials, in transit and in storage.

Today FIBREEN continues to protect huge quantities of war materials

of all kinds — *guarding them against damage* from rain, dust, sea water or salt air during long exposure to all kinds of weather — *keeping them in condition for use and action at destination*.

FIBREEN fits—because it's durable, completely waterproof, amazingly strong. It's used as a wrap, as a cover, or as a bag — in almost any size or shape — for planes, tanks and trucks or small arms, medical supplies, delicate instruments and vital repair parts.

It further fits the war program because it is produced many times faster than woven fabrics, with only a small portion of the labor, and at far less cost. In addition, it releases such vital materials as burlap and canvas for other important war needs—and costs much less.

Other Sisalkraft papers are also doing their part. They are being used to

cure concrete floors in arms plants — or runways of flying fields — and to help build strategic military and access roads—*providing a better cure, with fewer man-hours, and at lower cost*.

And farmers are using Sisalkraft papers to help solve their major problem of storing grains and feeds — and to provide the silos they need so badly.

That's how the entire production of The Sisalkraft Co. today is confined to essential war uses.

If your product fits the war program — if you are concerned about the delivery of your products *in the same excellent usable condition* as they leave your factory—write us and see if FIBREEN is the answer to your problem. *Tell us what you make and how you now pack it.*

THE SISALKRAFT CO

Manufacturers of Sisalkraft, Fibreen, Sisal-X, Sisaltape and Copper-Armored Sisalkraft

205 W. WACKER DRIVE - CHICAGO, ILL.
New York San Francisco London Sydney

In Canada Write to Alexander Murray & Co., Limited
at Montreal, Toronto, Halifax, Saint John,
Winnipeg, Vancouver



SERVING INDUSTRY, CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

When writing The Sisalkraft Co. please mention Purchasing



Protection and Correction for Industry's New Eyes

On the production lines today are many new pairs of eyes . . . some of them in an unfamiliar and confusing world . . . eyes whose owners may be unaware of the eyesight hazards which surround them.

For their protection . . . to protect war production programs . . . for America . . . put eyes of women workers, too, behind Bausch & Lomb Safety Goggles lenses.

Bausch & Lomb Safety Goggles afford maximum protection for eyes of valuable workers. With Prescription Ground Hardened Lenses they offer correction to defective eyesight and protection from physical impact.

With Bausch & Lomb Safety Goggles, lost production time and possible permanent loss of vital manpower due to eye injuries can be eliminated. Bausch & Lomb Optical Company, 741 St. Paul Street, Rochester, N. Y.

BAUSCH & LOMB

Safety Goggles

When writing Bausch & Lomb please mention Purchasing

Looking ahead with Asbestos



The significant wartime fact about K&M "Century" Flat and Corrugated Asbestos Lumber is that over 25,000,000 sq. ft. of it have already been supplied to vital war industries.

Arsenals, powder plants and factories have been quick to employ an industrial building material whose speed of erection is only rivaled by its freedom from time-and-money-wasting maintenance. For it requires no protective treatment for preservation from the attacks of rot, rust or weather.

K&M Asbestos Lumber, in flat and corrugated form, is formed into sheets by subjecting asbestos fibre and Portland

cement to tremendous hydraulic pressure. In combination these two indestructible elements not only toughen with age but are also highly resistant to fire.

The demands of war have for the present limited the general availability of this remarkable material for non-essential building. But, with the coming of peace, it will resume full peace-time employment in all types of industrial construction; along with new products that K&M's continuing research into asbestos promises to develop.

* * *

Nature made asbestos;

Keasbey & Mattison, America's asbestos pioneer, has made it serve mankind . . . since 1873.

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

Makers of

asbestos-cement shingles and wallboards; asbestos and magnesia insulations for pipes, boilers, furnaces; asbestos textiles; asbestos electrical materials; asbestos paper and millboard; asbestos marine insulations; asbestos acoustical material; asbestos packings; asbestos corrugated sheathing and flat lumbers; asbestos-cement pipe for water mains

When writing Keasbey & Mattison Company please mention Purchasing



Roll them off the Line with APEX

APEX POWER BITS and HAND DRIVERS for CLUTCH HEAD Type A Screws

APEX POWER BITS and HAND DRIVERS for PHILLIPS Reversed Head Screws

APEX POWER BITS, SOLID and INSERT BITS With Finders for SLOTTED HEAD Screws

The APEX Machine & Tool Co. Dayton, Ohio, U.S.A.

● Apex Power Bits and Hand Drivers speed war production wherever screws are used. They are made to fit practically all makes of electric, air and spiral drivers—from finest shock-resisting tool steel, heat treated and tempered for maximum wear resistance, toughness and strength.

● Apex Power Bits are long lived, but they do wear out eventually. When they do wear out, do not scrap them—return for RECONDITIONING at a very substantial saving over the cost of new bits.

● There are three Apex booklets—valuable guides to Power Bits and Drivers—each Bit illustrated—details given as to part number, dimensions and power tool it fits. You will want these booklets because of their helpfulness to you. *Write for them today!*

THE APEX MACHINE & TOOL COMPANY • DAYTON, OHIO

When writing The Apex Machine & Tool Company please mention Purchasing

"LIKE CUTTING
THROUGH BUTTER
... PHILLIPS SCREWS
TAKE THE HARD WORK
OUT OF FASTENING"



"AND DON'T FORGET!
PHILLIPS SCREWS
COST LESS TO USE"



Easier Screwdriving • Freedom from Accidents • Tighter Seating = 50% Less Assembly Cost with Phillips Screws

You'd know the difference if you were doing the job. In fact, executives who have their own home workshops are usually the quickest to see the advantages of the Phillips principle and adopt it for their firm's assembly work.

It really *is* easy to drive Phillips Recessed Head Screws. You get a better "grab" on the screw because the driver point and Phillips recess make a snug

fit. There's no danger of the driver slipping, so you don't have to spend a good part of your effort holding it in — you just keep *turning*. And there are more jobs on which you can use power drivers.

Translate this *ease of driving* into time and then time into dollars. An operator can, on the average, cut fastening time *in half*. Figure it out for yourself — then add the savings you get

from using fewer screws (better holding power often reduces number or size of screws needed), spoiling fewer screws (no split screw heads) and eliminating the cost of resurfacing screw-driver scars.

The Phillips Screw is certainly the *modern* fastening method — which means "better" and "more economical." Any of the firms below can supply you.



PHILLIPS RECESSED HEAD SCREWS

GIVE YOU *2 for 1* (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS


American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.

International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.

Pheol Manufacturing Co., Chicago, Ill.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

When writing Phillips Screw Manufacturers please mention Purchasing

THIS Saboteur HELPED MAKE THIS RECORD LAST YEAR



WORK ACCIDENTS

14,000 DEATHS


1,400,000 INJURIES

Cost to Industry \$700,000,000

HEAT-FAG, the unseen saboteur—the enemy of production—strikes at workers who sweat. In sweating, vitally needed salt is lost from men's bodies. They become inert — fatigued — careless — make mistakes. Lowered efficiency sets in—costly accidents can easily happen. And, priceless man-hours are lost.

AVOID HEAT-FAG—USE MORTON'S SALT TABLETS

This is how a Morton Salt Tablet looks when magnified. Quick dissolving (less than 30 seconds).



Case of 9000 10-grain salt tablets **\$2.60**

Salt-Dextrose Tablets, case of 9000 **\$3.15**

Morton's Dispensers

500-tablet size - **\$3.25**

1000-tablet size - **\$4.00**

ORDER NOW


Order from your distributor — or directly from this advertisement.

FREE Sample Tube

Write — on your firm letterhead — for a pocket size sample tube of Morton's Salt Tablets and for the new folder — "Heat-Fag and Accidents Ride Together."

MORTON SALT CO., Chicago, Illinois

EVERYONE WHO SWEATS NEEDS SALT



F.O.B.

Philosophy of buying

CREDIT General Somervell's new Services of Supply with one of the outstanding streamlining operations of the age. On July 1st, the ponderous War Department Procurement Regulations, an 1800 page compilation tipping the scales at 15 pounds, was superseded by a slim sheaf of "new permanent" regulations taking up only 120 printed pages including a 10-page index, and weighing a scant pound. But there may be a catch in it. The new compendium is punched for a standard three-ring binder. Instruction No. 1 announces that a variety of temporary regulations "will be incorporated into these permanent regulations at an early date," and Instruction No. 2 explains just how additional sheets are to be inserted.

The accompanying memorandum is identified as "(SPPDP-PPP 300.3)" which leaves us rather mystified except for a guess that the second part probably refers to the Purchase Policy & Procedure Section. But we can't help thinking of the "membership card" that a salesman friend flashed on Mrs. F.O.B. at dinner not so long ago. He was a member of the S.P.P.P.—the Society for the Prevention of Putting Parsley on People's Plates in Public Places.

WE suspect that the new regulations were condensed in the interest of conserving time and energy, rather than merely conserving paper. That paper shortage scare, which had buyers worried and mills working up to 103.8% of capacity in January as a result of faulty statistics, has proved to be one of the worst boomerangs in history to an industry which has had more than its fair share of ups and downs. It is reassuring to know that there isn't any paper shortage now; it is disturbing to learn that there never was a short-

age. And with a conservation-minded public trained in the earlier version, it may be hard to get back on an even keel. Bob Porter, former N.A.P.A. Vice President from Philadelphia, who has been directing the government's paper procurement schedules from WPB these past several months, has been a consistent and courageous advocate of facing the facts and telling the truth. His latest estimate is that the government's total paper requirements for the fiscal year starting July 1, 1942, will amount to 6% of estimated production, which shows a marked discrepancy from the 34% figure issued early last winter. Perhaps General Somervell's accomplishment, multiplied by hundreds of similar efforts, have contributed in bringing about this change.

One answer is to put paper to work. True conservation is not doing without things, but using them to best advantage, and there has never been a time when the printed word, carrying "know-how" information to industrial users of equipment and materials, and to new workers on unfamiliar jobs, could more effectively serve the national need. Industrial advertising has never been more interesting, more informative, and more important than right now when the popular plaint is that there's "nothing to sell."

JIMMY HATLO, popular and able cartoonist of the King Features Syndicate, turns his satirical pen upon the Purchasing Agent in a recent number of his series, "They'll Do It Every Time." It portrays a hot summer day in the office, and amid sweltering inmates who are begging for an electric fan, the P.A. sits cool and aloof, wearing a high stiff collar and his shirt sleeves neatly buttoned right down to the wrist. "So help me, Merwin," he explains, "I've been trying

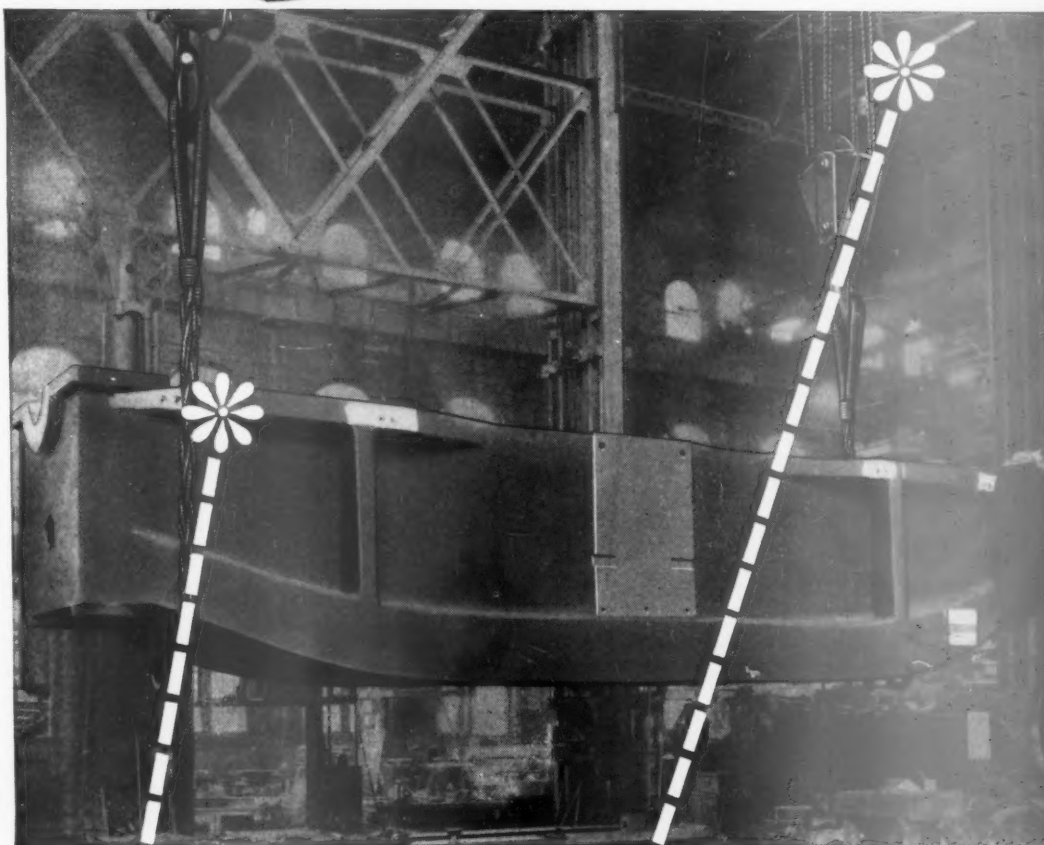
When writing Morton Salt Co. please mention Purchasing

to get a line on one. You know, it's tough these days. You gotta have a priority for anything with metal in it." Typical office opinions on buyers and buying, voiced by minor characters in the background include the following: "Why do they call him a Purchasing Agent? He thinks his job is to prevent anybody from buying anything around here." Or: "The heat never bothers him. He's got a heart like a snowball and freezing ammonia in his veins." The explanatory caption remarks, "Well, anyhow—the war gave the Purchasing Agents a new alibi." There's a credit line for the suggestion, sent in by I. M. Melting of Los Angeles. Though the name is obviously fictitious, some guilty Los Angeles buyer may recognize the situation.

We try to keep abreast of the current Washington vocabulary. One thing that helps is that whenever a new word is coined, everybody promptly drags it into the conversation so that it is properly impressed upon the listener. One of the latest expressions refers to "topside" matters, which means that the fellow higher up has to make the decision. In the eagerness to use the new term, F.O.B. gathers that one of the difficulties in Washington today is that everything is "topside."

FROM conservative Hopedale, Mass., comes news that a 126-year-old tradition has been broken by the startling innovation of employing women in the office of the Draper Corporation. The progressive pioneering took place in the purchasing department, where the Misses Virginia Creighton and Pauline Nason took the places of two men now in the armed services. What a responsibility is theirs! Management may take heart from the comforting knowledge that several other companies have been using feminine office personnel for some years without disastrous results. The roster even includes a number of top-flight purchasing executives so that opportunity beckons brightly for Virginia and Pauline. But their road may be a difficult one in conservative Hopedale, where even the telephone operator was a man until very recently.

Delivering the goods ahead of Schedule!



MACWHYTE
Atlas Braided Slings

MACWHYTE
CRANE ROPES

"Keep 'em moving fast, but SAFE!"
That's a pretty tough order, but Macwhyte Atlas Braided Slings are filling it. A look at this Sling's braided construction shows why...



You don't find this braided construction (of both left-&-right lay endless wire ropes) in any other sling. **BECAUSE** of this special sling body, Macwhyte Atlas Slings have...

- ★ Perfect balance that eliminates spinning
- ★ Extreme flexibility, they handle like a silken rope; resist kinking
- ★ No splices to wicker and injure hands
- ★ Positive safety of endless wire ropes.

Pipes, tanks, rolls, guns, engines, sheet steel, machinery... the list of materials handled today by Macwhyte Atlas Slings is almost endless. These **SAFETY** slings can help you step up production. Write on your company letterhead for helpful rigging bulletins.

You've seen the good news; perhaps you helped make it. Production of many war materials is "ahead of schedule"!

Handling materials faster in plants all over the U. S. A. is the job of Monarch Whyte Strand **PRE**formed Crane Rope. **SAFE...** fatigue-resisting and long-wearing, Monarch **PRE**formed asks no quarter in the battle of production, is a tried and proved soldier.

Prepare today for tomorrow

Macwhyte Company is ready and willing as always to help you get the correct size and construction of rope for your equipment. Our factory is on full schedule day and night.

Write to Macwhyte Company or any of our distributors and specify the following: Make, model, capacity of your crane—size, grade and construction of rope you are now using—preference rating, and approximate date you will be needing the rope.

CRANE ROPES to hoist the load . . .
BRAIDED SLINGS to harness it safely. **BUY BOTH FROM**

MACWHYTE COMPANY

2918 Fourteenth Avenue, Kenosha, Wisconsin—Manufacturers of wire rope to meet every need—Left-&-Right Lay Braided Slings—Stainless Steel Wire Rope—Monel Metal Wire Rope—Aircraft Cable, Aircraft Tie-Rods, "Safe-Lock" Swaged Terminals. Mill Depots: New York, Pittsburgh, Chicago, Ft. Worth, San Francisco, Portland, Seattle. Distributors throughout U. S. A.

Are You Taking

SURFACE CUTTING SPEEDS FOR VARIOUS GRADES OF COLD DRAWN CARBON STEEL ON AUTOMATIC SCREW MACHINES

Speeds given below are approximate and are to be used only as a basis from which proper speeds for the part in hand may be calculated. These figures represent averages for the general run of parts made from cold drawn steel. Any extraordinary features in the part to be made should be taken into consideration and the speeds altered accordingly.

A.I.S.I. Number	Present S.A.E. Number	Former S.A.E. Number	Surface Feet Per Minute	% Relative Speed Based on A.I.S.I. B1112 (S.A.E. 1112)
C1006	.....	.....	110	66
C1008	1008	.....	110	66
C1010 (light feeds)	1010	1010	120	72
C1012	.....	.....	120	72
C1014	.....	.....	120	72
C1015	1015	1015	120	72
C1016	1016	X1015	130	78
C1017	.....	.....	120	72
C1018	.....	.....	130	78
C1019	.....	.....	130	78
C1020	1020	1020	120	72
C1021	.....	.....	120	72
C1022	1022	X1020	130	78
C1023	.....	.....	125	76
C1024	1024	.....	120	72
C1025	1025	1025	120	72
C1026	.....	.....	120	72
C1029 (light feeds)	.....	.....	120	72
C1030	1030	1030	115	70
C1033	.....	.....	115	70
C1035	1035	1035	115	70
C1036	1036	.....	105	64
C1040	1040	1040	105	64
C1042	.....	.....	105	64
C1043	.....	.....	105	64
C1045	1045	1045	95	57
C1045 Annealed	1045	1045	120	72
C1050	1050	1050	90	54
C1050 Annealed	1050	1050	115	70
C1052 Annealed	1052	.....	85	51
C1055 Annealed	1055	1055	85	51
C1060 Annealed	1060	1060	85	51
C1061 Annealed	.....	.....	85	51
C1064 Annealed	.....	.....	80	49
C1066 Annealed	1066	X1065	80	49
C1068 Annealed	.....	.....	80	49
C1070 Annealed	1070	1070	80	49
C1074 Annealed	.....	.....	75	45
C1078 Annealed	.....	.....	75	45
C1080 Annealed	1080	1080	70	42
C1085 Annealed	1085	1085	70	42
C1086 Annealed	.....	.....	70	42
C1095 Annealed	1095	1095	70	42
B1008	.....	.....	130	78
B1011	.....	.....	130	78

FREE CUTTING STEELS

C1109	.....	.....	135	82
C1110	.....	.....	135	82
C1112	.....	.....	135	82
C1113	.....	.....	155	94
C1115	1115	1115	135	82
C1116	.....	.....	155	94
C1117	1117	X1314	140	85
C1118	1118	X1315	140	85
C1120	.....	.....	135	82
C1121	.....	.....	135	82
C1122	.....	.....	135	82
C1132	1132	X1330	125	76
C1137	1137	X1335	120	72
C1141	1141	X1340	115	70
C1144	.....	.....	120	72
C1217	.....	.....	140	85
B1110	.....	.....	140	85
B1111	1111	.....	155	94
B1112 (Union Free Cut)	1112	1112	165	100
B1113 (Union Supercut)	1113	X1112	225	136



REPUBLIC

FULL ADVANTAGE OF THE

Uniform Machinability

OF UNION COLD DRAWN STEELS?

With wartime demands for mass production of duplicate steel parts becoming greater and more urgent day by day, every facility and every opportunity for increasing output must be utilized to the utmost.

You steel parts manufacturers are working wonders in production.

And we at Union Drawn will continue to do everything within our power to help you do the job.

The uniform machinability of Union Cold Drawn Steels—the outstanding feature of these steels for more than half a century—is being steadily maintained. The unvarying cutting qualities, the uniform structure, the freedom from tool-wearing abrasives and the smooth finish after machining are today equal to or better than those of last year or preceding years. Hence you can depend upon these steels to help you maintain consistently high production efficiency and quality of finished parts. Physical properties and heat treating qualities are being maintained at their high levels, too.

Are you taking full advantages of this uniform machinability in stepping up and holding an increased rate of production?

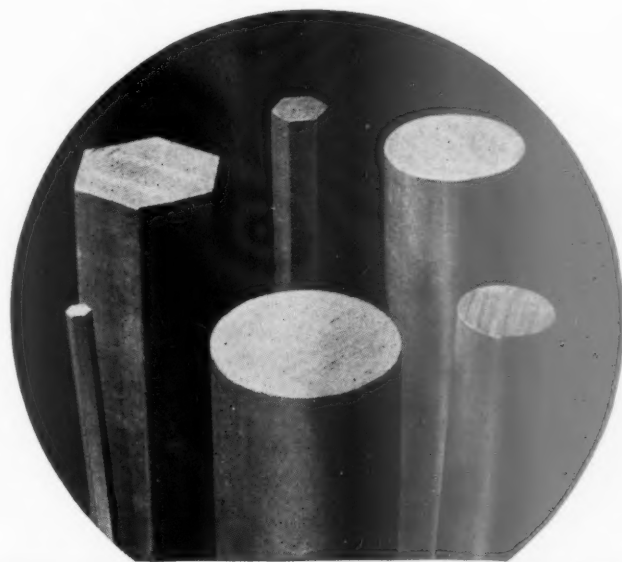
To help you establish the most efficient rate of output, and to provide you with a handy reference for comparing steels by their various designations and machinability, we present the table of surface-cutting speeds for various

grades of cold drawn carbon steel shown on the opposite page.

While our most important job today would seem to be the production of every possible pound of the most machinable steel in needed analyses, we continue to feel an equal responsibility in assisting steel parts producers to obtain the highest rate of production of perfect parts from that steel at the lowest cost. If some particular problem concerning the use or performance of Union Cold Drawn Steel is bothering you, tell us about it. We want to help you find the answer—*quickly*.

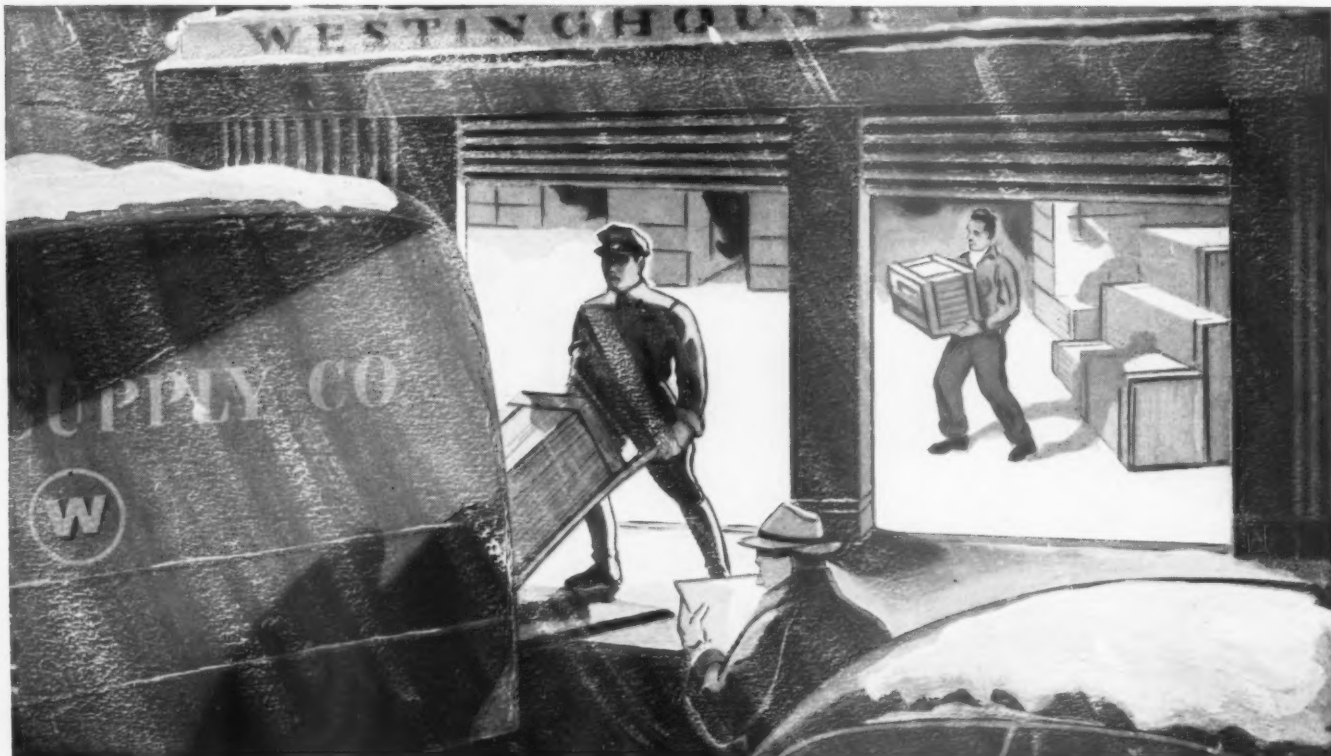
UNION DRAWN STEEL DIVISION REPUBLIC STEEL CORPORATION MASSILLON • OHIO

Berger Manufacturing Division • Niles Steel Products Division
Steel and Tubes Division • Culvert Division • Truscon Steel Company
Export Department: Chrysler Building, New York, New York



Union Cold Drawn Steels

AN ELECTRICAL WHOLESALER HELPS SPEED WAR PRODUCTION



WESCO'S 24-hour service sped 3-shift war job

WESCO SPEEDS PRODUCTION

- * U. S. ammunition depot required lighting for urgent night-time operations, yet no wiring or electricity was allowed in building. Wesco engineer solved problem and met 3-week deadline.
- * A steel plant urgently needed 18 different electrical products. Delivery promises by manufacturers ranged from 60 days to 9 months. Complete order delivered by Wesco in 3 days!

WESCO SERVES BUSINESS

- * By offering prompt delivery of electrical items from large stocks.
- * By maintaining perpetual inventory stock records.
- * By providing trained sales and engineering personnel.

*The name that means
everything in electricity*



Supplied 125 Products from 10 Makers to Complete 2½ Acre Building in 60 Days

Orders were flashed to Utah to build a 3-story Army Corps Administration building covering 2½ acres. A three-shift army of mechanics and workmen took over in heavy snows and temperatures ranging down to 7° below zero.

The local Wesco House went on a 24-hour basis, 7 days a week. Its job was to rush to these men a constant supply of 125 different electrical products made by 10 manufacturers in quantities, as needed, day or night. Stock rooms, shipping department and trucks were continuously manned. The Wesco representative answered emergency phone calls at all hours of the night and started material on its way through the blizzards.

Wesco's alert service and diversified stocks have always met the demands put upon them. On the final day, the huge building stood ready for the Army to move in. Wesco's "know how" was learned during 20 years of peace. Today that ability is devoted to Victory; then it will again serve business with increased experience and efficiency.

Westinghouse

ELECTRIC SUPPLY CO.

150 VARICK STREET • NEW YORK, N. Y.

A NATIONAL DISTRIBUTING ORGANIZATION WITH 79 BRANCHES

When writing Westinghouse Electric Supply Co. please mention Purchasing

PURCHASING PREVIEWS

From the Washington office of

PURCHASING

National Press Building

Washington, D. C.

August 1, 1942

For Purchasing Executives:

INFLATION CREEPS UP—OPA, the front line battalion in the battle against inflation, was hard pressed during the past month, particularly as it had a good deal of its fighting to do in Washington. The skirmish for the new appropriation was finally won, after some nasty words and disciplinary beatings had been tossed in Mr. Henderson's direction. It was a large order, to be sure, but needed to do a large job—which is larger than it might be if the administration could forget politics in an election year and effectuate a real anti-inflation policy. It is fairly certain that Mr. Henderson would willingly sacrifice a substantial part of his budget for a clear and forceful stand on the wage and agricultural issues, and that he would get better results.

The general price ceilings, relatively new and practically untried as a factor in our national economy, already show signs of breaking through at vital points. What OPA needs is not more policemen, but some one to climb upon the roof with Mr. Henderson and help to hold the ceilings down. So far it has been principally a matter of words—parity and wage stabilization, and those in authority are loath to give any practical definition of what wage stabilization means. The administration has prided itself on its "perfect timing" and has pulled out of many an emergency before at just the psychological moment, though there are some who believe that some of these emergencies might not have developed to that stage if earlier action had been brought to bear. It may pull out again, but it is playing a dangerous game against time.

A year or more ago, the warning slogan was to the effect that inflation comes by five percent increases. Three of those five percents have already been recorded in the cost of living, and those ahead are far more dangerous than the ones already here. Anyone will grant that rising costs of living and stationery incomes present a discouraging picture for the earner. Yet to initiate broad wage increases on the sole basis of keeping pace with those living costs is as neat an example as one could seek of putting a vicious spiral into operation, and the results of such a policy are bound to be disastrous in spite of anything that OPA may do to head it off.

* * * *

TAXES—Anyone who has paid taxes in the past has steeled himself to the idea that the new levies will be on a far greater scale, and for the most part they are quite in accord with the necessity of this situation, accepting it willingly so long as it has a basis of equity and promises to meet the problem of financing a world war. Business as a whole believes that no fortunes should be made from this catastrophe. A new formula based on an old principle is being more and more widely discussed, though it has no official blessing and is unlikely to get one. This is the proposal to calculate personal income taxes on the "surplus profits" basis applied to corporate earnings, taking a person's income for 1940 or some other base

period and levying heavily on the increases since that time, which may fairly be considered as resulting from war activity. That would be one way of stabilizing incomes and tapping a vast new field of revenue.

* * * *

WAR PRODUCTION—Reports on the war production program continue to show output beating the promise and keeping pace with expanding demands. The reorganization of WPB is additional evidence that this civilian agency is successfully progressing from the earlier phases of its problem to the new phase. WPB is the last to suggest this is a reason for complacency, but it is an excellent basis for confidence in the outcome over a long and hard pull.

One aspect of this change that is not altogether on the surface, and that has not been fully appreciated is that the primary procurement job of finding sources with the capacity and willingness to undertake this gigantic and all-important effort, or to make arrangements to set up such facilities, is virtually a closed book. The fundamental pattern of war procurement and production in relation to our industrial economy has been established. Most of those firms equipped by capacity, equipment, "know-how" and managerial enterprise, to take over the prime contracts for materials of war are enlisted and very thoroughly committed to that operation, even to the extent of engaging in manufactures quite foreign to their normal line of business. But those who for one reason or another are not yet converted to war production and are now seeking contracts as their normal outlets are drying up, are likely to be referred to their more patriotic and far-sighted competitors and will be forced into the role of subcontractors to them.

This is not necessarily a dark picture, for there is still need of every bit of production capacity that can be mustered to reach and maintain the levels of output that will be needed for victory. Subcontracting will be more important rather than less in the months ahead, and is in all respects as direct a contribution to winning the war as any other part of the effort. However, it has greatly altered the picture for those whose task it now is to seek and secure the business that will keep plants running.

* * * *

FIVE PERCENT BOYS—Perhaps this situation has had something to do with a new outbreak of the commission men who trade in "influence"—real or imaginary—with glowing promises of lucrative government business. Procurement offices in Washington have renewed their pleas to abolish this wasteful and expensive abuse. No legitimate business man needs a special representative of this sort, and in fact is likely to do himself far more harm than good by relying on such representation.

Washington is going even farther than this in keen investigation of those engaged in such activity and in reviewing contracts, declaring such expenditures not allowable as costs of doing business. These fees may be recovered by the government, which is likely to be embarrassing for the firm after the money has been spent, usually in good faith so far as the manufacturer is concerned.

* * * *

RUBBER—Synthetic rubber may be closer than was generally believed, if recent developments live up to advance notices. Then again, it may not be so simple. This remains the No. 1 problem among basic raw materials. It is reassuring that this is one division staffed by men who know their trade. In June, weeks before the scrap rubber drive was launched on a national scale, Administrator Newhall estimated the probable recovery from this source at 450,000 tons. The official total was announced last month at just over 454,000, which would seem to justify a vote of confidence in the Administrator's judgment.

— THE EDITORS



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PURCHASING

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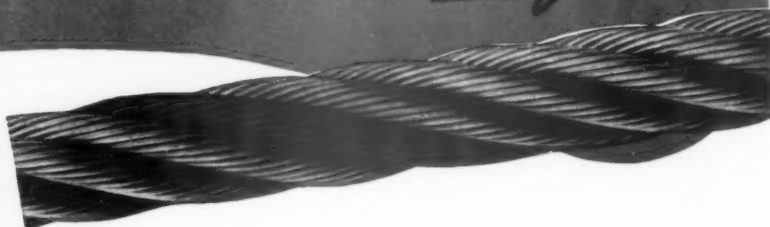
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RUBBER FROM GRAIN

BY a vote of 104 to 18, the House of Representatives passed the Fulmer Bill to create a new rubber supply agency with complete jurisdiction over the production of grain alcohol and rubber from agricultural products. It is no new and startling discovery by Congress that synthetic rubbers can be produced from grain. Nor will anyone take issue with the declaration that American business needs tires and that the public wants to see this industry established. The important point is that the vote was so overwhelmingly affirmative after both the War Department and the War Production Board had argued strongly against the proposal, which affects an extremely critical material and would impose a further burden in respect to the construction, equipment, steel, machine hours, and manpower necessary to carry a rubber-from-grain program into effect at this time.

This is not primarily a jurisdictional quarrel in respect to a particular material. It touches the basic question of whether we are to have a planned and coordinated war program or whether we are to destroy that coordination and balance by cutting up the problem into unrelated pieces and arriving at piecemeal decisions.

WPB has deeply considered the possibilities of rubber from grains, and from petroleum, and from other sources. It has expert technical counsel, and it has what no other agency in country can have—the knowledge of the intricately interrelated needs of this emergency and the limited supplies of materials with which we have to work. And it has before it, night and day, the urgent time-table to which our production must be held. All of these factors had a part in its decision on rubber policy. It is possible, of course, that the decision may not have been right, but it is probable that it was far more right than any other agency, governmental or private, could possibly arrive at.

The record of accomplishment to date is such as to warrant confidence in WPB's judgment and in its capacity for effective action, in regard to the overall program. Congress assumes a serious responsibility in undertaking to make these decisions themselves against the advice of those appointed for that very purpose. There is no surer way of nullifying judgment and making action impossible.

Stuart F. Neimitz



Switch to NE Alloy Steels

to Save Critical Metals

TO HELP conserve nickel, chromium, vanadium and other scarce metals, the War Production Board's ablest metallurgists have developed NE (National Emergency) Alloy Steels. These new steels contain relatively small quantities of alloying elements in such combination as to produce physical properties usually attributed to steels of much higher

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To Replace AISI and SAE

Nos. A 2300, A 2500, A 3100,
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NE 4042 and NE 8744.

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Nos. A 2330-35, A 3130-35,
A 4130-35, A 5130-35, A 6130-35.

High Hardening Grades

NE 4047 and NE 8749.

To Replace AISI and SAE

Nos. A 2300, A 3100, A 3200,
A 4100, A 4600, A 6100.

Only limited data on heat-treatment response or physical properties will be available when NE Alloys are first ready for shipment. The WPB is anxious to know how these new steels will function and requests all NE Alloy users to report results in working with these new steels. Ryerson will cooperate fully with

users, supplying laboratory test data, and all other available information.

• • •

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RECLAIM CUTTING TOOLS to Beat Shortage

How International Harvester's Manager of Manufacturing used advices from Purchasing Department in quickening wartime tool conservation—Company executes program involving interchange between plants through a Central Tool Salvage Department, saving worn and broken tools within each works by low-temperature brazing and other methods, and sending them out to reconditioning companies

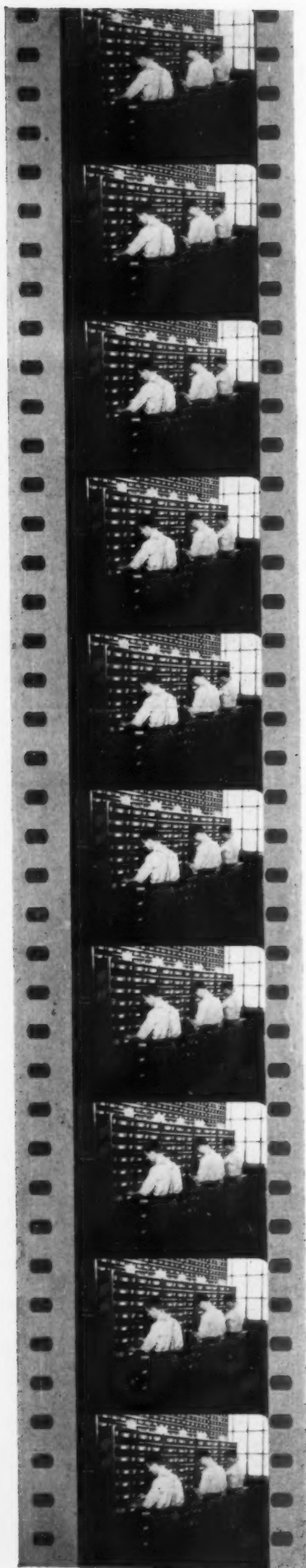
By Herbert E. Fleming

Such a successful cooperative program of salvaging small cutting tools has been developed by the International Harvester Company during the wartime shortage of purchasable new tools that this company has complied with a request to make a sound motion picture of its methods. It is one of a handful of companies to do that at the request of R. A. Wheeler, of the

Billboard at plant gate reminds workers daily of importance of tool conservation. (Above)

Industrial Salvage Section, Bureau of Industrial Conservation, War Production Board.

This Harvester program contains much for Purchasing Agents and buyers to pass along as practical precedents for assistance of the production men in their organizations. This holds not alone for those in companies with two, three, or many plants, where inter-works cooperation is possible. In view of the emphasis in the Harvester program on action by each works in its far-flung organization, and incidentally in



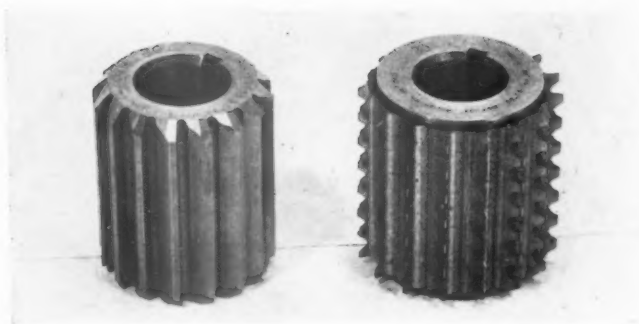
Shell reamer (at left) made from used-up spline hob (at right). "Regashed" on Baber-Colman hob sharpening machine, diameter ground to size on cylinder grinder, and backed off on cutter sharpener.

view of the use each makes of outside independent tool-salvaging concerns, it is also a practical plan for the purchasing man in a one-plant company.

The tool salvage program of the Harvester company also has in it much of inspiration for the hard-pressed members of purchasing departments themselves. One such inspiring feature is that the history of the launching and pushing of this program shows that a purchasing department gets its due recognition from a manufacturing department for cooperation in giving timely, up-to-date, dependable information on present or prospective possibilities of delivery under purchase orders for new tools or any other materials or supplies. And in these days when the WPB has announced a non-stop campaign for salvaging steel for the duration, and when the securing the small cutting tools—the shooting ends of machine tools—is more difficult than ever, although no less important for war production, that is encouraging to Purchasing Agents and buyers.

When F. H. Harrison, Manager of Manufacturing for the entire Harvester company, took steps last August for raising to the *n*th power that company's long-standing practice of salvaging small tools and tool steel, he sent a strong letter to the superintendents of the com-

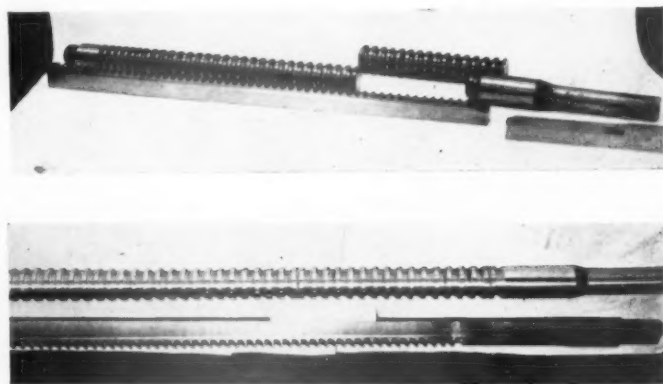
Photograph at top shows round broach and flat broach as prepared for low-temperature brazing. Lower photograph shows round and flat broaches after braze and before flash was filed or ground off and prior to re-sharpening.

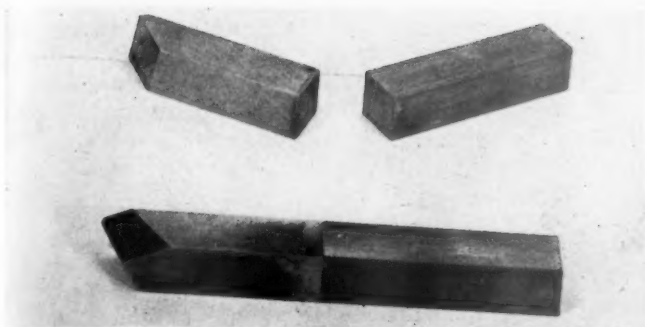


pany's works. In its first paragraph he quoted R. M. McCulloch, Manager of the Purchasing Department, on a warning of danger ahead because of inability to get early delivery on the purchase of small tools. Mr. Harrison attached to that letter two letters—one from C. R. Granquist, a priorities man, and one from W. E. Ray, a buyer in the purchasing department. At that time a mandatory preference rating of A-10 had been established on cutting tools, but the farm implement industry had not been able to obtain a rating better than B-1, although it was later given an A-8, and still later an A-3, and an A-1-A. But even on orders for tools for Harvester's war jobs, manufacturers were not scheduling deliveries short of four months.

The buyer's letter pointed out that in that period, even with a rating between A-1 and A-10, the company could not hope to make up for lost time in getting outside production and purchase of tools and it would be necessary for the various plants to help themselves out in their own tool rooms in many cases. The strongest paragraph in that letter said: "If a rating is not obtained in the very near future, the condition is going to be almost hopeless, as far as securing new tools is concerned." Mr. Harrison, in his letter to the superintendents, quoted Mr. McCulloch as emphasizing the point that these statements "were not overdrawn." So he said to the superintendents, "We must take immediate steps to help ourselves." And that was done.

This use by a production executive of advices from a purchasing department in starting the ball rolling for a speed-up of tool salvage was effective in part because of one of Mr. McCulloch's long continued practices. This is to take account of the force of circumstances, and "everlastingly to call attention to the importance of watching inventories and of giving the Purchasing Department as much time as necessary to get deliveries on orders for the various works." But to the outside observer it is clear that if past warnings of the purchasing department had not been accurate, if they had been cries of "wolf," this timely word on small tools could not have been quoted so effectively by the manager of manufacturing.





High speed turning tool made from stub end and alloy steel shank. Ends were squared and joined by low temperature brazing, done in an alignment fixture. Then cutting edge was ground to specifications. No other machining operation was necessary.

Announcement of the establishment of a central tool salvage department, a general store for small tools for all of the seventeen plants of the company that they could not themselves respectively recondition and use, was a tangible new feature of the notice issued by Mr. Harrison to the superintendents. Furthermore he assigned to H. W. Hecht, of the manufacturing department, the full time job of following up on the tool salvage work at the various plants and the central tool salvage.

Central Tool Salvage

This central tool salvage unit was established at the company's Milwaukee works. That plant was chosen partly because V. A. Guebard, its superintendent, formerly a tool engineer, had developed tool reclamation to a high degree. He in turn appointed as supervisor of the central tool salvage store E. C. Tagatz, who had done intensive work in supervising that plant's tool service, grinding, and salvage. There, before a foreman from any of the 95 departments can get a new tool, he has first to see if he can get one from the tool salvage department. Additional bins were erected for the central tool salvage store. The various works listed and then shipped to it boxes of worn and broken tools of thirty-eight kinds. Of these the most numerous have been, in order: drills, reamers, tool bits, milling cutters, and broaches. For drawing on this central inventory, a works superintendent either writes or sends his own salvage supervisor there to see what is available; then on requisitioning the central salvage store for specific used tools to be reconditioned he states whether they are to be shipped to his works or to a given reconditioning concern.

This central tool salvage store has been a good thing in itself. But its greatest value has been through its effect on the superintendents, tool engineers and others at each of the works, spurring them first themselves to do all they could in tool making and reconditioning. For Mr. Harrison in his letter announcing the central tool salvage plan had said to the superintendents: "You must produce in your own tool rooms all small tools which you have been in the habit of ordering on the outside, and it may also be necessary to modify or

simplify the character of the tool so that you can get by. . . . The prime motive behind the centralized tool salvage at Milwaukee is to utilize to the best advantage odd sizes and worn out tools which you could not use in your own tool rooms without excessive waste of material."

The individual works, all of which have been following this injunction, are as follows:

Farm Implement Group—McCormick Works, Chicago; East Moline, Ill.; Richmond, Ind.; Canton, Ill.; Rock Falls, Ill.; Chattanooga, Tenn.; Auburn, N. Y.

Tractor Group—Tractor Works, Chicago; Farmall Works, Rock Island, Ill.; West Pullman, Chicago; Milwaukee, Wis.

Truck Group—Indianapolis, Ind.; Springfield, Ohio; Fort Wayne, Ind.; St. Paul, Minn.

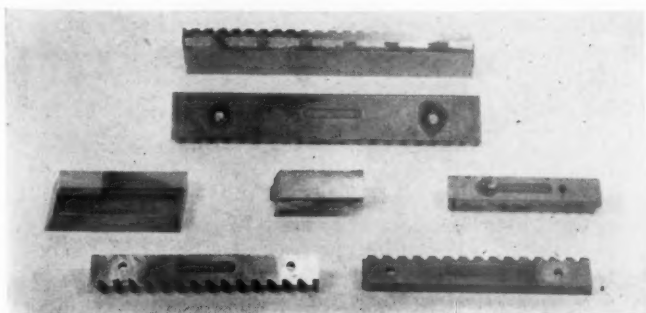
Miscellaneous Group—Wisconsin Steel Works, Chicago; McCormick Twine Mill, Chicago.

A Comprehensive Program

Here is a list of the methods followed, with varying degrees of emphasis, at the various works:

1. Encouraging and educating employees operating machines to avoid, so far as possible, tool breakage.
2. Appointing a tool salvage supervisor for the works.
3. Having him comb each department, looking under

Low-temperature welding rod was successfully used to build up broken out portions on high speed tools. For instance; broken out portions of dovetails on forming tools were filled in and reshaped. Also weak sections, pulled out around bolt holes on flat broaching bars, were filled in and redrilled. Not a single failure was experienced on any of the above mentioned tools.





A Stellite side mill was made from an alloy steel blank and scrap Stellite cutter blades. The blank was made about $\frac{3}{8}$ " smaller in diameter and the sides about $\frac{1}{4}$ " narrower than the desired dimensions of the cutter, hub was left the full width. The slots were made .010" wider than the thickness of the blades to allow preparation with low temperature brazing material.

benches, in drawers and out-of-the-way places, for worn and broken tools.

4. Setting up display tables on which the tools broken in each foreman's department are examined weekly by his fellow foremen and the tool engineers of the works.

5. Redesigning tools, including their modification and simplification.

6. Changing production methods, for example the substitution on a machine of a series of simple operations for previously combined operations.

7. Cutting down broken large-size tools to serve as smaller tools.

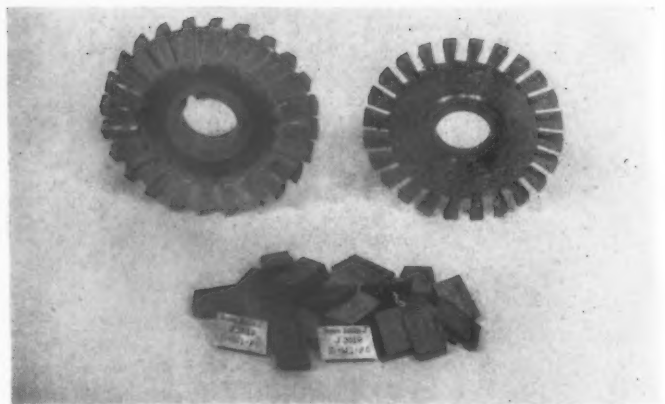
8. Carrying on low-temperature brazing of tools, such as has been highly developed at the company's Tractor Works, in Chicago.

9. Sending out tools to be reconditioned for the works by a tool salvage company.

Among the management methods in this list one of the most effective, as purchasing agents may report to their production executives, is that of having a plant display table with sections numbered for the various departments, and the weekly display of broken tools. This plan not only puts the various foremen on their toes to hold down the displays in their respective sections of the tables, but it also brings to the surface breakages which may be due to machine defects or other causes found to be uniform in the various departments. It gives a basis for effective follow-up work in tool re-design.

Low-Temperature Brazing

Then among the technical methods in the list the one



that is outstanding is the low-temperature brazing. This has been so helpful that an outline of procedure to be followed has been compiled, under eleven headings, as follows: 1. Broken broaches; 2. Milling cutters from scrap materials; 3. Milling cutters—Slitting saws; 4. Milling cutters—side or plain mills; 5. Used-up form tools; 6. Extension reamers from standard reamers; 7. Under-size flat broaches built up to original size; 8. Used-up tool bits; 9. Drills broken through flutes or cutting end; 10. Form tools broken through dovetail section; 11. Form tools broken by complete fracture.

The detailed steps on getting extension reamers from standard reamers are typical. These are: "(A) Select two scrap standard reamers of proper size; (B) Cut off desired piece of one reamer; (C) Grind joint-ends square and smooth; (D) Clean joints thoroughly with carbon tetrachloride, using a stiff bristle brush; (E) Prepare joint-ends by coating with flux and brazing material; (F) Clamp in alignment fixture; (G) Butt braze; (H) Remove flash by filing or grinding; (I) Grind O. D. to proper size; (J) Back off; (K) Sharpen."

Using Outside Facilities

It may seem surprising that a large company like Harvester, with tool salvaging so highly developed at its various plants, and with such extensive possibilities of interchange between plants, should send out perishable tools for reconditioning. But this company does not let pride stand in the way of taking advantage of the services of the concerns specializing on tool salvage.

Even the Milwaukee works, with its advanced tool salvage department, and the central tool salvage store under its roof, does not hesitate to do that. When tooling up for a special job last November, the Milwaukee men found that suppliers of milling cutters which were needed could not deliver until June of this year. They selected five worn cutters of larger sizes than those required and sent them to a reconditioning company in Chicago, since their own high-class grinding department was not equipped to cut them down to the sizes needed. The result was a factor in the starting of production in December on schedule.

Inter-Plant Exchange

While following these various methods Harvester has continued its practice of having each plant issue to the others two lists. One is made up of its "surplus" tools; the other, "obsolete" tools. The former are tools of up-to-date make no longer needed at the plant having them because of changes in product design or in production schedules; the latter are out-moded. Trans-

fers are made from one plant to another on the basis of original cost for the "surplus" and half of cost for the "obsolete."

An over-all method followed in the Harvester organization has been not merely the interchange of tools but also the interchange of experiences in small tool salvage. About three months after the quickened program was started there was an all day session attended by men concerned in this work at each of the plants. This was held in Chicago at the company's Tractor Works, which was highly organized for small tool salvage and which had done advanced work, notably in the low-temperature brazing. At this conference one of the engineers emphasized the point that "tool salvage, tool research, tool design, and tool purchasing must work together." He expressed the opinion that each works should have a good man to work with those in these four fields to see that "small tools are not purchased with shortcomings in original design." The buyer whose warning had been emphasized by the Manager of the Purchasing Department was present at this conference to bring the tool salvage men up to date on prospects concerning small tools and the metals required for them.

The results of this small tool salvage program in the Harvester plants have been such that with the reconditioned tools, plus the many new special tools necessarily purchased for war production, it has been able to go forward with machines running on schedule, and in many cases ahead of schedule, under its contracts to make a variety of military vehicles and armament. For example, when it converted an unused warehouse "somewhere in the middle west" into a factory for war production, there was need of a quantity of broaches. New broaches could not be had on time. Pieces of broken broaches were sent to the Tractor Works and, by low-temperature brazing, salvaged broaches good for the job were turned out.

In the nation's war-production, running this year to \$43,000,000,000 and scheduled according to Donald M. Nelson, Chairman of the WPB, to run at current prices to over \$70,000,000,000 in 1943, consideration of costs is not the first objective. It is getting out the guns, planes, tanks, ships, and ammunition to our fighting men. Nevertheless tool salvage, besides speeding up production by providing equipment with which to work, does hold down the cost of the small cutting tools, all of which are classed as "perishable tools," and are a day-to-day source of operating expense, often equal nearly to one-fourth of that of productive labor. Superintendent Guebard of the Milwaukee works says that the cost of reconditioning, whether done there or by a salvaging company, is usually only about 60% of the cost of a new tool. From visits to and reports by the various plants Mr. Hecht finds that the saving from the salvage of small tools in a four-weeks' period ranges from \$500 to \$7,500, depending on the nature and size of the plant.

The small tool salvage program of International Harvester preceded its comprehensive scrap collection campaign, carried on in its plants, on farms through its dealers, and in homes through employees. This is

an activity which has received much commendation from the WPB Bureau of Industrial Conservation and from the press. Although now a subdivision of that general campaign, the Harvester small tool salvage program has been outstanding and will be continued for the duration, also doubtless thereafter.

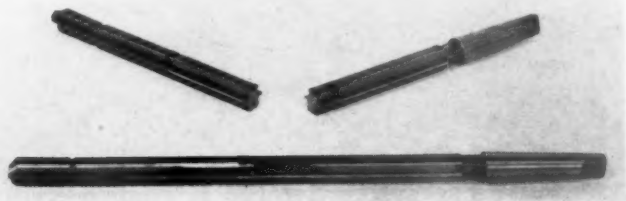
Purchasers Can Help

Meanwhile Purchasing Agents and buyers of other companies will draw on it for ideas and practical precedents. They will do well to accept any opportunity given to see the Harvester movie, a 1,000 foot, one-reel film, entitled "Save Those Tools," among the films to be circulated by the American Society of Mechanical Engineers. The pointers about the possibilities of inter-plant cooperation for large companies are readily realized. But the Purchasing Agent or the buyer for a one-plant company may say, "Yes, but"; yes but what is there to be had from it for me? Here in summary are a few answers. Let the purchasing department men:

Give the production department up-to-date information on prospects as to purchase and delivery of small tools.

Have all its advices to the production executive so dependable that their warnings will be accepted as authoritative.

Point out to plant superintendents: (a) the desirability of appointing a tool salvage supervisor; (b) the recoveries from combing a plant for overlooked worn and broken tools; (c) the good effect on foremen from weekly table displays of worn and broken tools and the hints such displays give to tool engineers; (d) the possibilities of changing production methods, redesigning tools, and re-



Extension reamer made from two used-up reamers. After cutting off front and rear end of old reamers, ends to be joined were ground smooth and square, then were brazed under low temperature, finished, ground, and sharpened.





claiming them through low-temperature brazing.

Learn about the facilities of the independent companies that specialize in salvaging tools for manufacturers, send purchase orders to them as one way of helping toward winning the war.

Here it may not be out of order to say that at the conference of Harvester tool salvage men there was read a letter from the War Department, United States Engineering Office, which said: "An investigation of the practicability of salvaging used and worn cutting tools, such as drills, reamers, counterbores, and milling cutters, leads us to believe that considerable saving could be effected through your efforts if contacts are made with companies who are doing this work commercially, thus conserving, to some extent, the available supply of new tools. Among the companies who do this work are the following: American Tool Salvage Co., Chicago, Ill.; Eastern Tool Salvage Co., Newark, N. J.; National Salvage Co., Detroit, Mich.; Renu Tool Co., Detroit, Mich.; Rutland Tool Salvage Co., Detroit, Mich."

Another, to which Harvester's Milwaukee Works sends this sort of work, is The Conant Tool & Engineering Company, Chicago.

Today orders placed for new cutting tools will on the average not result in deliveries from shelf up to four or five months or longer. The need for speeding war production becomes more and more urgent. So, by the same token, does the need for salvaging small cutting tools. No Purchasing Agent would care to see the war lost, "all for the want of a small cutting tool."

R. M. McCulloch
Manager of Purchasing

His foresight, a year ago, helped to set the tool salvage campaign in motion



F. H. HARRISON

Manager of Manufacturing

The tool salvage and reclamation program comes under his general supervision



C. R. GRANQUIST

Priorities Division

Tool conservation provides working equipment when priorities can not get delivery



W. E. RAY

Buyer

He sounded the warning of difficulties in the procurement of new small tools

H. W. HECHT

Manufacturing Department

He has a full time job in following up tool salvage at the plants and the central department



Car Conservation can Break the Transportation Bottleneck

Production is futile unless the products can be delivered. Materials for war equipment and supplies must be transported to fabricating and assembly shops, from subcontractors to prime contractors along the natural production line, then to camps and depots, and to ports to reach armies in the field.

The specter of a transportation tie-up for lack of railroad freight cars is very real. While every shipyard in the nation is feverishly active, the car shops may soon buck their last rivet because of the pinch in critical materials. But by recognizing this situation in time, and doing something about it, the crisis can be averted.

1942 CAR BUILDING PROGRAM HAS BEEN CUT BY 71.5%

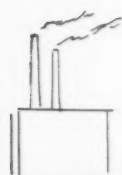


(Each unit represents 10,000 new cars.)

The recommended car building program for 1942, to handle the transportation requirements of the war production program, called for 130,000 new railroad freight cars.

Because essential materials used in building rail equipment are urgently needed to make

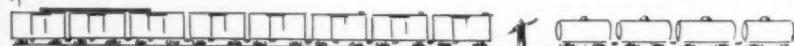
guns and tanks and shells and ships, the War Production Board on April 9th cut 1942 car building to 37,000 units.



NEW DEMANDS ON RAILROAD CAR FACILITIES

The increasing tempo of war production calls for a corresponding increase in transportation facilities and service, more cars constantly under load.

Meanwhile, the hazards of war add to the railroad burden. Every torpedoed tanker and collier eliminated from coastwise shipping service puts a new strain on the limited supply of tank cars, hopper bottoms and gondolas.



UTILIZATION RATIO



ONE CARLOAD



ONE CAR



ONE WEEK

Car utilization is figured on the basis of car-weeks in relation to loadings, including the entire period during which the car is in service in handling a shipment—loading, in transit, and unloading—until it is released for loads by other shippers. If it required just one car for each load offered each week, 1,000,000 cars would handle the volume of business represented by a 1,000,000 week carloading. That ratio has never been attained.

THE PEAK LOAD

Railroad traffic reached its all-time high volume in the week of October 18, 1941, when carloadings reached a total of 922,884 cars.

Carloadings (922,884)



Cars required (1,600,000)



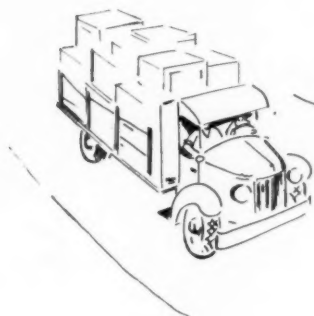
Only 40,000 railroad cars were not under load in that week—a critically narrow margin.

BUT . . . If just one day could have been saved in loading or unloading each of those 922,884 carloads, 130,000 fewer cars would have been required to handle that traffic. By the simple device of eliminating one day of idleness from each load, railroad patrons would have "created" as many additional freight cars as the country's builders could have turned out this year while using tons of critical materials needed for the armed services.

(Statistics by Allen Dean, Manager of the Transportation Bureau, Detroit Board of Commerce, and Chairman, Car Efficiency Committee, Great Lakes Regional Advisory Board.)

How the Purchasing Agent can Help

See that every carload is a full carload. Avoid minimum tonnage and fractional carload space. Idle space is a waste of useful facilities that are as urgently needed as the materials themselves.



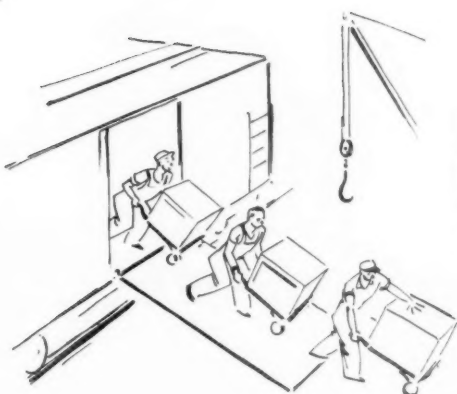
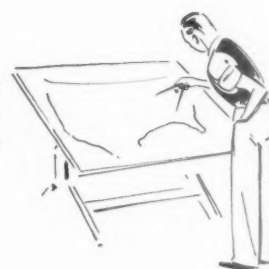
Use trucks for short hauls and less than carload quantities.

Authorize shipment only when cars can be unloaded immediately at destination. Tell suppliers: "Don't load this order until I give you an absolute shipping release."



Provide temporary storage facilities if necessary to keep goods from standing in railroad cars when those cars should be rolling. A freight car is not a store-room.

In giving traffic instructions, shorten rail routings whenever possible. This save haulage. More important, it saves time.



Plan and organize shipping and receiving procedure so as to load and unload in hours instead of days. Every hour saved is a contribution to the utilization of car equipment.

KEEP 'EM FULL AND KEEP 'EM ROLLING!

The 130,000 new cars cannot be had today at any price. But by efficiently using what we have, we can literally manufacture equipment out of space and hours.

Camp Shelby Quartermaster Says:

"CUT THE RED TAPE and Keep Them Supplied"

BR:gf

OFFICE OF THE CAMP QUARTERMASTER
Camp Shelby, Mississippi

July 7, 1942

Purchasing
205 East 42nd Street
New York, New York

Gentlemen:

The article on page 89 of the June issue of Purchasing has been read with interest. At Camp Shelby we are cutting the red tape to "keep 'em supplied". Through experience a simple and efficient method of purchasing and contracting has been worked out. If this system is followed as set out below, I think it will answer the problem of too much red tape.

All requisitions come to the desk of the Procurement Clerk. The items are checked against the General Schedule of Supplies to ascertain whether or not they are to be purchased on Government Contract or by negotiation. If items are not on contract a work sheet (Exhibit A) is made. All items are listed on this work sheet and two or more quotations solicited by telephone or letter according to Circular Letter 175, dated April 27, 1942, Office of the Quartermaster General (Exhibit B). A purchase order (Exhibit C) is drafted and entered in the purchase order register. It then goes to the Fiscal Clerk and is obligated against funds in an allotted status. The purchase order is marked "posted" and given to the Purchasing and Contracting Officer for approval. It is then typed and the following distribution made:

1. Signed original with copy of billing instructions to the contractor, (Exhibit D)
2. Copy to the organization making requisition.
3. Copy to the receiving warehouse.
4. Copy to Quartermaster's personal file.
5. Copy with requisition and work sheet to Procurement file.

When a vendor receives an order he simply has to fill it from stock or order from his supplier since the purchase order quotes the price he bid and the delivery date he guaranteed.

As far as is possible all orders are placed locally. This saves time, transportation charges, and leaves the larger plants free for other war production.

Cut the red tape and "keep 'em supplied".

Joseph P. Sullivan
JOSEPH P. SULLIVAN
Colonel 2. M.C.
Camp Quartermaster, 54.

Date _____

Exhibit A

[illegible]

APPROVED:

TOTAL

Exhibit B

Exhibit C

WAR DEPARTMENT
42, M. C. FORM NO. 306
Revised April 15, 1937

PURCHASE ORDER

WAR DEPARTMENT

CONTRACT NO. (If Any) W.....

PURCHASE ORDER
OFFICE IDENTIFYING NO.

REGISTRATION NO.

TO EXPEDITE PAYMENT PLACE THE ABOVE NO.
PACKAGES, ENCL. AND CORRESPONDENCE

PAYMENT WILL BE MADE BY FINANCIAL

AT

TO WHOM INVOICES IN TRIPlicate, WILL BE
FOR 1 OF INSTRUCTIONS ON THE REVERSE SIDE

THE SUPPLIES AND SERVICES TO BE
INSTRUMENT AND AUTHORIZED BY, ARE FOR
FORTH IN, AND ARE UNCHANGEABLE TO PRO
ITY. NO QUOTED BELOW THE AVAILABLE
IS SUFFICIENT TO COVER COST OF SAME.

AUTH. NO.

DATE

TO

SHIP TO

..... No. Allows

In accordance with your bid dated No.

conditions and requirements thereof, award is hereby made you for furnishing the following articles. Allow

quantities cited per unit, exclusive of condition 7 on reverse side hereof.

Discounts F. O. B.

Deliveries Inspection

QUANTITY	UNIT	ARTICLE	UNIT PRICE

.....

.....

SEE IMPORTANT INSTRUCTIONS ON REVERSE SIDE WHICH ARE MADE PART OF

Exhibit D

WAR DEPARTMENT
OFFICE OF THE QUARTERMASTER GENERAL
WASHINGTON, D. C.

CIRCULAR LETTER)
NUMBER 175)

APRIL 27, 1942

SUBJECT: Negotiated Purchases.

1. Circular Letter No. 114, O.Q.M.G., 1942, is rescinded. Army regulations 5-240, February 11, 1936, as amended, have been suspended by P. S. General Directive No. 34, April 9, 1942, in so far as the following instructions are concerned.
2. In order to expedite the procurement of supplies, to eliminate the time and delay occasioned when formal bids are solicited, to be assured of satisfactory performance by awarding only to contractors having adequate financial responsibility; satisfactory records of performance; necessary machinery and equipment, and competent management, all supply contracts will hereafter be negotiated. All contracts for supplies, equipment and non-personal services are supply contracts.
3. If, in a particular case, the contracting officer deems it to be in the interest of the United States to secure bids by formal advertising, approval for such procedure must be obtained from this office. Requests stating in detail the reasons therefor will be submitted to the Director of Procurement Service, Office of The Quartermaster General.
4. Awards of contracts or changes therein amounting to less than \$5,000,000 (or when the estimated amount in the case of cost-plus-a-fixed-fee contracts, or changes therein, is less than \$5,000,000) may be made by the contracting officer without the approval of higher authority. When an award amounts to \$5,000,000 or more, it must be forwarded to the Director of Procurement Service, Office of The Quartermaster General, for approval.
5. The following special instructions will govern the making of negotiated purchases:
 - a. Hereafter, all negotiated purchases will be made under the authority of the Act of December 18, 1941 (Public No. 354 - 77th Congress), which may be referred to as the "First War Powers Act, 1941," and Executive Order No. 9001, December 27, 1941. All negotiated contracts will contain the following statement: "Negotiated under authority of the First War Powers Act, 1941, and Executive Order No. 9001, December 27, 1941."

BILLING INSTRUCTIONS

Properly certified invoices in quadruplicate should be submitted to Finance Officer, Camp Shelby, Mississippi. They should be marked "Original," "Duplicate", etc. Following is a sample invoice. The certificates should be typed, written, stamped, or printed on all copies and only the original invoice is to be signed and only the original certificate.

JOHN DOE COMPANY,
Hattiesburg, Mississippi.
June 19, 1942.

Sold To: Quartermaster,
Camp Shelby, Mississippi.

12 ea. Shovel Handles	@ 3.35	\$4.20
1 gr. Screws	@ .45	.45
		<u>4.65</u>

I certify that the above bill is correct and just; that payment therefor has not been received; that all statutory requirements as to American production and labor standards, and all conditions of purchase applicable to the transaction have been complied with; and that State or local sales taxes are not included in the amounts billed.

JOHN DOE COMPANY
By:

John Doe, President.

NOTE: It is important that the invoice be submitted in quadruplicate, and that all copies bear the above certificate. Payment cannot be made if these instructions are not complied with.

Stencil #260-no (6-13-42)

Purchaser's Responsibility For

CEILING PRICE

COMPLIANCE

**OPA interpretation suggests that a certificate from the seller is
a reasonable legal precaution but does not automatically relieve
the buyer of his liability under the law**

An interpretation issued by the Office of Price Administration states that buyers can gain a measure of legal protection from the sanctions of the Emergency Price Control Act of 1942, by obtaining from the vendor a certification that prices are not in excess of the maximum prices established under the regulation. The Act makes buyers in the course of trade or business equally liable with sellers to prosecution for violation of any regulation or order of the Price Administrator.

The interpretation is in the form of a letter from OPA's legal division in answer to an inquiry from the National Association of Purchasing Agents regarding this liability. According to this letter, OPA's policy is to require buyers to "exercise good faith and an honest, reasonable judgment." It is suggested that obtaining a certificate of compliance from the seller, either on the face of the contract or invoice, or in a separate document, could be construed as evidence of good faith.

However, the mere possession of such certification does not automatically relieve the buyer of liability. In addition, he must have no knowledge or reason to believe that the price exceeds the maximum. Other circumstances surrounding the sale, including prior dealings with the same or similar sellers, also enter into consideration of whether the buyer acted in good faith and exercised reasonable judgment.

The letter notes that several regulations, including the General Maximum Price Regulation, make it difficult for buyers in some instances to ascertain the legal maximum price. In these cases, it is not the intention of OPA to impose an impossible burden on

buyers. The letter also stresses OPA's desire to minimize the difficulties that may impede an orderly and regular flow of goods, particularly goods essential to the war program.

The text of the interpretation follows:
"National Association of Purchasing Agents
"Gentlemen:

"This is in reply to your letter of June 3, 1942, requesting a statement of policy from the Office of Price Administration on the protection afforded a buyer by a certification from his vendor that the price of a commodity does not exceed the maximum price established by this office.

"The Emergency Price Control Act of 1942, and the price schedules and regulations issued thereunder, impose a liability for violation of the schedules or regulations not only upon the seller but also upon the buyer in the course of trade or business. It is not the intention of the Office of Price Administration to impose upon such buyers an impossible burden where, because of the nature of the price regulation, it is extremely difficult for the buyer to ascertain the maximum price of the commodity which is purchased.

"Under some regulations, maximum prices are established at stated dollar prices for particular types of commodities. Under other regulations maximum prices, for certain types of commodities, are the list prices of the vendor for such commodities prevailing on a named date. These regulations do not raise serious problems for buyers as the maximum prices can be readily determined by buyers as well as sellers.

"Many schedules and regulations, however, establish maximum prices which are
(Continued on page 164)

"It is not the intention of the Office of Price Administration to impose upon buyers an impossible burden . . . It is the policy to require the buyer to exercise good faith and an honest, reasonable judgment."



How PURCHASING AGENTS Avoid Law Suits

Some recent court decisions that may
guide the buyer and avoid litigation

By LEO T. PARKER

Attorney at Law

EVERY purchaser is frequently confronted with legal problems. And very often the correct solution of a problem of this nature results in saving of many thousands of dollars, including payment of damages, lawyer fees and other relevant expenses.

Sufficient and elementary knowledge on the part of purchasers may result in reasonable certainty that various business matters shall be so conducted that their legal rights are preserved. In this manner suits will be won, and they may also avoid legal controversies. Therefore, we shall review certain important points of contract law, as decided by modern higher courts.

Contract Obligations are Continuous

First, it is important to know that a contract may be *automatically extended without* any act or word on the part of either the buyer or seller.

These late courts hold that purchase contracts are automatically extended for a period equal to the term of the original contract. This law always is applicable if the same relations between the contracting parties continue at the time of expiration of the original contract.

For illustration, in a leading case (38 S. W. (2d) 634) it was shown that parties entered into a written

contract. At the end of the first year the parties continued with the same relationship.

Litigation developed and since a new contract was *not* made at the end of the first year, and the contract was not terminated, the court held that the same relation between the parties continued to exist into and through the second year. The higher court said:

"When one contracts for a definite period, and continues after the expiration of that period, without any new contract, the presumption is that it is continued on the terms of the original contract and that provisions and restrictions forming essential parts of the contractcontinue in force."

This same rule of the law is applicable with respect to all contracts which have a definite term or duration. For example, a tenant who retains possession of leased property after the lease has expired *is liable* for payment of the rent *for a period equal to the full term of the expired lease*. However, if a tenant vacates the premises at any time *before midnight* of the day the lease terminates he is not liable for payment of rent during the following term. Nor is he liable if it was agreed that the contract should automatically terminate.

And if a purchaser agrees to accept delivery of a specified quantity of merchandise monthly for the period of a year, this same contract is automatically

renewed if neither party cancels it before the end of the year. In other words, silence constitutes legal renewal.

Law of Employes

During the past six months several purchasers have expressed interest in contracts which restrict and prevent employes, as Purchasing Agents, from accepting competitive employment. Therefore, it is important to know that contracts usually are valid by which purchasing agents, and other employes, agree not to engage in a similar, or competing business, if the time limit is for a reasonable and definite period of time. In other words, the law broadly is well settled that if the nature of the employment brings the employe in personal contact with the customers of the employer, or enable him to acquire valuable information, a contract is valid by the terms of which the employe agrees not to engage in competitive employment, providing the contract does not violate the rule that the time during which the restraint is imposed, and the territory it embraces, shall be no greater than is *reasonably necessary* to secure the protection of the business or good will of the employer.

It would seem, therefore, that the enforceability of contracts of this nature is determined by the reasonableness of the contract and the restraint imposed, as being *necessary* to the legitimate protection of the employer's business. Therefore, employers who contemplate writing contracts of this nature for signature of their employes, must keep in mind that *in all cases* the validity of the contract depends upon whether its terms are necessary for the preservation of both the business and good will of the employer, after the termination of the employment. If such contract imposed a greater restraint on the employe than is necessary to secure such protection, the contract is unenforceable as being contrary to public policy.

Also, a contract of this nature is void if it fails to contain a clause specifying exact salary employe shall receive before termination of the employment.

For example, in *Nettles*, 160 S. 42, it was disclosed that an employer made contracts with employes containing a clause which provided that the employe "will not at any time while he is in the employ of the employer, or within six years after leaving its service" engage in competitive employment. This contract did *not* contain any clause or statement as to how long the employe would be employed or what salary would be paid to him. Therefore, the higher court promptly held the contract unenforceable.

Briefly, in order that contracts of this nature shall be valid and enforceable (1) the Purchasing Agent should be restricted from taking competitive employment more than a year after leaving the present employment; (2) he should be hired for at least four to six months, subject of course to his being discharged for any just cause or reason to be determined by the employer; (3) the territory specified in which he will not accept competitive employment should never be larger than the immediate territory; and (4) the contract should contain a clause by which he obligates himself to pay the employer reasonable damages for a breach.

Signature Liability

A great deal of legal controversy has arisen as to when, and under what circumstances, a Purchasing Agent is personally liable on contracts, notes, etc., intended to bind the employer.

Therefore, it is important to know that many courts have held that Purchasing Agents are personally liable on contracts of sale signed for an employer, if by reference to the signature it is *not* clearly understood that the signing was intended to bind the employer. However, where the Purchasing Agent signs the employer's name, per himself and signifying his official capacity he is not liable.

For example, in *Paper Inc. v. Finch*, 136 So. 496, legal proceedings were instituted against the president and secretary of a corporation to collect \$17,500 due on a promissory note. The note was signed: "Broad Albin Company, by Henry C. Finch, president, Millicent M. Finch, secretary."

In holding the officials *not* personally liable for payment of this note, the court stated the following important law:

"Where signatures of individuals appearing immediately under the name of a corporation on an instrument, are preceded by the word 'by' and followed by words of official capacity, respectively, such words indicate that the parties signed in a representative capacity, and the individuals so signing are *not* liable on the instrument, if they were duly authorized."

Using, as a basis, higher court cases decided during the past two years, this rule has been formulated:

A Purchasing Agent is personally liable (1) if he makes a false written or oral statement or representation of his authority with intent to deceive a seller, or his agent; (2) or, if he performs any unlawful act with or without authority of his employer; (3) or, if he performs a damaging or injurious act although believing that he has authority, but actually has none; (4) or if he wilfully performs an act which results in damage to any one; (5) or, if he does damaging acts outside his scope of authority, although while so doing he intends to render his employer a valuable service; (6) or, if he intentionally assumes an obligation for his employer; (7) or, if he unintentionally but legally assumes an obligation while performing services for his employer.

A majority of readers may erroneously believe that the chances are slight of Purchasing Agents becoming involved in litigations of this nature. Nevertheless, the law books are full of decisions involving suits against purchasing agents by sellers who discover that the employer is for many reasons unable to pay the account. Such condition may arise, for example, (1) if the employer becomes insolvent; (2) or, if the employer is bankrupt; (3) or, if the employer endeavors to avoid his legal obligations to accept and pay for merchandise purchased by the Purchasing Agent; (4) or, if the employer becomes involved in litigation with the seller whose lawyer may decide that the contract price for delivered merchandise may be readily collected personally from the Purchasing Agent.



SHIPPING GOAL INCREASED

● Admiral Emory S. Land, head of the U. S. Maritime Commission, predicts that the goal of 15 million tons of shipping annually, set by President Roosevelt in the Victory Program, may be exceeded by as much as 5 million tons in 1943. Shipbuilders have been outstanding in their "beat the promise" achievements. Thirty-six merchant vessels were completed in April. The May total exceeded fifty. Admiral Land predicts that launchings will be at the rate of three per day before the end of 1942.



OEM Photo By Palmer

PRODUCTION REQUIREMENTS PLAN

Presents Major Problems To Purchasing Agents

Information now being compiled in Washington will be the basis of controlled distribution of scarce materials for military and essential civilian uses.

By A. N. WECKSLER

FROM a minor and relatively unimportant functioning plan, the Production Requirements Plan has been elevated to the system under which all major metal fabricating industries are required to operate.

PRP—or Purp as it is variously termed—is an outgrowth of the Defense Supplies Rating Plan, which was formulated early in the defense economy as a simple plan under which companies making a large variety of products could basket their ratings and obtain required materials.

The successive increasing drains on metals created by the expansion of the war production program reduced the effectiveness of the priorities system. This was somewhat offset by the limitations on civilian

industry. However, the major production lines created by the conversion of the automotive industry have already absorbed such metals as have been released through civilian industry curtailment.

Early priorities controls were aimed at insuring adequate materials for military and essential civilian requirements. The premise of operation of the priorities system was that war industry should have a blank check on such materials as it required. Civilian industry was to have the balance.

The War Production Board is now operating on the basis that such civilian industry as is permitted to use metals is essential to the nation's economy and morale. The problem ceases to be one of reserving materials

for war output, and now becomes one of controlling available materials and rationing them to various end uses.

To accomplish this purpose, the War Production Board first cancelled the blank check on scarce metals which formerly was carried by a priorities rating. While ratings are still available for a large number of plants operating under P-Orders, or obtained through PD-1A applications, PRP definitely restricts the materials obtainable on the ratings assigned.

Although it was fundamentally true that the inventory restrictions imposed through Priorities Regulation No. 1 represented somewhat of a curb on excessive inventories, the priorities system did not provide any method of correlating the quantities of materials which could be purchased through use of ratings with the actual rate at which the materials so purchased were being processed.

The basic difficulty in establishing a true allocations system at that time was a lack of data both as to available material and exact requirements of the various essential war and essential civilian industries. As a large segment of industry is in the process of conversion, it is also difficult at this time to gauge accurately what the requirements will be.

At the same time, there is a degree of uncertainty as to the exact tonnage of materials which will be available. Also, further to complicate the picture, South America is a source of substantial tonnage of copper and other basic materials, bringing the uncertain shipping situation into the picture as a major factor.

These elements of uncertainty dictated the operating framework of the Production Requirements Plan, and in large part explain many of its peculiarities.

Its obvious function is to correlate the distribution of materials to the end use sanctioned by the War Production Board. It is its further purpose to reduce the levels of material inventory to an operating minimum. It is believed that if Government controls can assure a continuous delivery of material requirements, industry can continue to operate at peak output, despite sharp reductions in backlog of materials.

First step in making PRP applicable to the major segment of industry was to restrict the quantity of material obtainable through the use of blanket priorities ratings. Instead of a blank check on delivery of materials, PRP provides a rating for a limited quantity of materials. The priorities rating system is retained,

but the ratings merely denote the order of urgency in delivery. They provide a priority in delivery of a specified amount of materials.

PRP differs from a direct allocations system in that it does not guarantee the delivery of materials for which ratings have been granted, and if a number of high ratings deplete the materials available, the orders carrying lower ratings will not be filled. Objective will be to gear the ratings to available materials.

The Government conception of the Production Requirements Plan is that it is an approach toward complete allocations, but that the unsettled state of industry and of material supply will not at this time permit the operation of a complete allocation system.

PRP will be the operating medium of industry during the third quarter. The period will be both experimental and fact-finding. In conjunction with the Plan, the Allocation Classifications will be used to trace the flow of materials from the raw material stage through to the finished product.

Allocation Classifications may not be tied into PRP operation until the first quarter of 1943. However, the WPB Copper Branch is currently using Allocation Classifications to allocate copper to brass foundries on the basis of the end use of the resultant casting.

The Allocation Classifications will have no functional phase during the third quarter, and possibly not during the fourth quarter. It is merely a code which industry must use to identify the end use of the material or product purchased. However, it can readily be seen that the Allocation Classifications will have a vital function in the operation of a complete allocations system.

To see the complete picture clearly, it is necessary to analyze the information that will become available to the War Production Board through the operation of PRP and the Allocation Classifications.

The PD-25A reporting form which industry is required to file in operating under PRP will reveal the applicant's material requirements for a three-month period to produce a specific dollar volume of goods, though it does not completely correlate the materials with a specific end use.

Further, PRP is designed as a control mechanism at a particular stage of fabricating—the machine stage, and does not therefore provide any check on the flow of materials through the various other stages incident to complete assembly of a finished product.

The Allocation Classifications, through the use of



James S. Knowlson, recently appointed Vice Chairman of WPB in charge of Program Determination, who will direct overall PRP and Allocations Classification Policy.

identifying symbols, will provide some check on the flow of materials.

PRP will provide the mechanics of material distribution, through controls over metals at a specific stage of processing, and Allocation Classifications will furnish the data through which the War Production Board will be guided in its allocation of metals.

Currently, it is believed that a control over metals will cover the operations of war industry, with the exception of such specialized output as requires the use of kapok, rubber, silk, nylon, manila fiber, or other non-metallic scarce materials. These materials are processed by a few major processors, and are easily adaptable to a separate allocations system.

However, PRP may be broadened at a future date specifically to control these materials. In fact, PRP and the Allocation Classifications are subject to change, and it is being freely forecast in Government quarters that a number of changes will be made. It is not even final that the two parallel control plans will be retained, but it is apparent that whatever controls finally will be found necessary will of necessity develop from the experience gained in administering PRP and the Allocation Classifications.

Administering the Plan

The Production Requirements Operating Committee—which will consist of representatives from all WPB operating units concerned with the distribution and use of materials, as well as liaison with the military service—will supervise the administration of PRP and the Allocation Classifications.

This committee, recognizing the fact that the controls must be continually adjusted and developed, will work on refinements of the plan, and direct its improvement.

Overall control group for the flow of materials is the Requirements Committee, coupled with the newly created Office of WPB Vice Chairman on Program Determination, which tallies the requirements of industry for scarce metals. The requirements are matched against the available supply, and a rough estimate is made of how much curtailment in use is necessary.

The curtailment is then applied to various industries, largely those considered less essential. Naturally,



Charles M. Schoenlaub, administrator of PRP.

military and combat items are not cut.

The curtailment as applied to a particular industry is incorporated in a processing directive, and this directive is set up as a guide for the processing of all PRP applications which fall into the category of that industry.

In the processing of a PRP application, where the amount of a scarce material to be allocated has been cut, the other materials will be reduced to some degree. This is aimed at avoiding unbalanced inventories, as in most cases the scarce materials—such as steel and copper—are the factors which limit total output.

Purchasing Agent's Responsibility

The Production Requirements Plan places the major burden of operation on the Purchasing Agent, who is forced to gear his commitments to the tonnage limitations placed on his orders by the materials allocated under PRP.

One of the major problems which arises is that of devising some system of controlling purchases of the metals which have been assigned by the War Production Board. The filing of the application for materials on PD-25A forms is likewise a major concern to the Purchasing Agent, even though this operation may not always fall directly under his jurisdiction.

The PD-25A application is a statement of so-called minimum material requirements for a three-month period of operation. The War Production Board processes this application, and approves a specific percentage of the tonnage of metals applied for, assigning priorities ratings to the purchase of the materials so sanctioned. This does not necessarily guarantee that the materials will be available, but it is the purpose of the plan to approve purchase of materials which are available. Only unlooked for shipping difficulties, in the case of an imported material, or emergency conditions in this country would create conditions under which materials sanctioned under PRP could not be obtained.

It is forecast by PRP officials that the uncertainties of obtaining materials during the third quarter will be eliminated during the fourth quarter of this year. Index used to gage the metal needs of industry for the current quarter was the information in the reports filed on PD-275 reporting forms (metal use reporting forms), which gave an incomplete overall picture.



Blackwell Smith, who as advisor to WPB on priorities problems, played an important role in developing the Production Requirements Plan and Allocation Classification.



Assistant to Schoenlaub in handling PRP is Walton C. Groce.

Actual PRP operation during the third quarter will provide a more realistic outlook for fourth quarter allotments of materials.

In many cases, the amount of materials applied for in the PRP allocation will be substantially cut. The plant management must then make the decision as to whether the level of material operating inventory is to be cut, or some other approach is to be taken.

WPB officials indicate that unless there is a clear case of error in the processing of a PRP application, or some gross discrimination has occurred, adjustments will not be made. Further, the attitude of the Government will be severe where plants purchase in excess of the amounts sanctioned under the Production Requirements Plan.

Industry Must Provide Records and Control

It therefore becomes necessary that whatever the tonnage allowed by the War Production Board, some control system be set up by industry to tabulate accurately what portion of materials allowed by the Government has been committed, and what amount is still available for purchase order.

In some instances, the problem is simplified by the nature of the plant. The Purchasing Agent, upon receipt of the processed PRP application, merely commits the entire tonnage of materials which has been approved by the WPB.

Where this procedure is not practical, it then becomes necessary to set up some simple system of recording the balance of materials still not committed through purchase orders. This tabulation of a diminishing balance of materials should be set up for each material which has been allocated.

The tabulation of this diminishing balance should show the date of purchase, the purchase order number, the priorities rating used, the tonnage of material involved, the firm with whom the order was placed, and finally the tonnage of material which has not yet been committed through placement of purchase order.

There is no required procedure in this connection, and each plant may devise a control system best suited to its own needs. It is, however, extremely important not to purchase in excess of tonnage of materials sanctioned. Aside from the patriotic aspect of cooperating with the Government in the emergency, any sub-

stantial leakage of materials through evasions of PRP will lead to additional and more stringent regulations.

Careful controls over use of PRP ratings to obtain materials is further advisable, as the War Production Board is planning to audit the operations of all PRP units.

In scheduling deliveries on orders placed during a quarter year period, it is required that deliveries during the first month should not exceed 40% of the total, and that an equal amount may be received in the second month, with the remainder to be scheduled for delivery during the third month of the quarter. However, it is recommended by the PRP administrators that deliveries be split in three equal monthly amounts. In the case of orders for delivery to meet schedules—such as on orders for a special run of steel—exception will be made to the 40-40-20% limitations.

Scope of the Regulation

Regulations governing the operation of PRP are set forth in WPB Priorities Regulation No. 11, which makes operation under the plan mandatory on Class I producers.

A Class I producer is defined as "any person (or any branch, plant, department or other division of a corporation or business which operates as a separate entity and maintains a separate inventory) whose receipts or withdrawals from inventory during the most recent calendar quarter, or whose anticipated receipts or withdrawals from inventory during the current or next succeeding calendar quarter, of metals in the forms included on the Metals List aggregate five thousand dollars or more in value, except

"1. Any agency of the United States, of any foreign government, of any state or territory, or of any subdivision thereof except when and to the extent that any such agency is engaged in the manufacture of commodities or other materials (such as shipyards, arsenal prison factories, etc.); and

"2. Any person to the extent that he is engaged in the business of (a) transportation by any means; (b) furnishing of heat, light, power, electricity, gas or water to others; (c) mining or quarrying; (d) production, refining, transportation, distribution or marketing of petroleum or associated hydrocarbons; (e) communications; (f) sewerage or drainage; (g) the



A manufacturer discusses his problems with a PRP official.

sale of material which he has not manufactured, processed, fabricated, assembled, or otherwise physically changed, including sales as a distributor, wholesaler, retailer, warehouse, industrial or mill supply house or scrap dealer; (h) extracting, smelting, refining, alloying, or similarly processing metal ores or scrap into raw metal; (i) construction, at the site, of buildings, structures, or projects."

Some controversy developed as to the applicability of the Plan to an industry that uses metals as operating materials incidental to processing, but does not directly process such metals. The Plan was made applicable to such industries, provided their use of the metals covered by the regulation placed them in the Class 1 category.

The directives for operation under PRP are set forth in the regulation as follows (firms operating under PRP are referred to as PRP Units):

"Restrictions on PRP Units.

1. After June 30, 1942 . . .

a. No PRP Unit shall apply any preference rating to deliveries of any material other than those authorized on its PRP Certificate; and no PRP Unit shall extend any preference rating which has been applied or extended to it by any other person.

"b. No PRP Unit shall accept deliveries (whether rated, unrated or allocated) of any material included on the Materials List specified on its PRP Application form, or of any material not on such list for which it requested priority assistance on its PRP Application, in excess of the quantity specifically rated or otherwise authorized by its PRP Certificate; provided that this restriction shall not prevent the acceptance of delivery when priority assistance is denied on the express ground that such material can be obtained without such assistance.

"c. No PRP Unit shall duplicate, in whole or in part, purchase orders which it has placed with one or more suppliers for delivery of any material (whether rated, unrated or allocated) in such manner that the amount of such material ordered exceeds the amount actually required for delivery, even though the PRP Unit intends to cancel or reduce its purchase orders, prior to completion of delivery, to the amount of actual requirements as rated or otherwise authorized on its PRP Certificate.

"Each PRP Unit, immediately upon receipt of its PRP Certificate, shall cancel or reduce its outstanding purchase orders calling for delivery within the quarter covered by such Certificate to the amount of its actual requirements as rated or otherwise authorized on such

Certificate or any previous PRP Certificate and not yet received; provided, however, that no person shall be required to cancel any order calling for delivery in the third quarter of 1942 of any metal in any form included in the attached Metals list, if the Producer thereof certifies in writing to such person that substitution of other orders is impossible and that cancellation would disrupt the producer's production schedules and result in diminished production; in such case delivery may be accepted under such order without regard to the restrictions of paragraph 1 (b).

"d. Each PRP Unit shall, so far as practicable, place its purchase orders for the material rated or otherwise authorized in its PRP Certificate so as to call for substantially equal deliveries during each of the three months of the quarter, and shall in no event, unless absolutely necessary to maintain its delivery schedule or to obtain the minimum quantities practically procurable, order for delivery during the first month of the quarter more than 40% or during the first two months of the quarter more than 80%, of the total quantity of any material authorized for rating during the quarter."

The PRP Regulation makes metals subject to its provisions when they are in the following forms:

Anodes, bars, billets, blooms, blocks, castings, (including die castings), cones, dust, extruded shapes, fabricated shapes, foil, forgings, ingots, pigs, pipe, plates, powder, rails, refinery shapes, rings, rivets, rods, scrap, sheets, shot, skelp, slabs, strip, structural shapes and piling, tie plates and track

accessories, tube and tubing, tube rounds, wheels and axles, wire and wire rods, wire products (including barbed and twisted fencing, bale ties, nails, staples, rope and strand).

The metals so controlled are:

Iron, carbon steel, alloy steel, stainless steel, aluminum, magnesium, copper, brass, bronze, lead (including antimonial), zinc, nickel, tin, cupro-nickel, monel, nickel-silver, chrome nickel, babbitt metal, solder, type metal, metal carbides, antimony, arsenic, beryllium, bismuth, cadmium, cobalt, iridium, mercury, molybdenum, palladium, platinum, platinum-iridium alloy, rhodium, ruthenium, tungsten.

Also subject to the PRP controls are the following ferro-alloying agents:

Calcium molybdate, ferrochromium, ferrocolumbium, ferromanganese, ferromolybdenum, ferronickel, ferrotitanium, ferrotungsten, ferrouanium, ferrovanadium, ferrozirconium, ferro-carbon-titanium, ferrophosphorus, ferrosilicon, silicomanganese, spiegeleisen.



Analysts reviewing PRP applications.

Also the following oxides and other compounds of nonferrous metals:

Aluminum chloride (anhydrous), aluminum fluoride, aluminum oxide (refined), antimony oxide, chromic oxide, chromite (exclude refractory grades), cobalt oxide, copper sulfate, lead carbonate, lead oxide (litharge), lead peroxide lead sulfate, magnesium oxide, mercuric oxide, mercury chlorides, molybdenum oxide, nickel oxide, potassium chloride, potassium chromate and dichromate, sodium chromate and bichromate, sodium tungstate, tin chlorides, titanium dioxide, tungsten ores and oxides (basis 60% WO_3), vanadium oxide, zinc oxide (leaded), zinc oxide (lead free), zinc sulfate.

Status of Priorities

In addition to the regular reporting form PD-25A, there is available an Interim Reporting Form PD-25F, which is to be used when an applicant requires a material for which he has not received a rating in his PD-25A application—as in the case of a new contract requiring additional material, or where the rating assigned is not sufficiently high to obtain delivery of required materials. The interim form may also be used to appeal the WPB action in processing the original application.

Filing of a PD-25F in no way jeopardizes the ratings or assignments already made on the PD-25A application. An appeal awaiting action by WPB does not suspend either the ratings or the approval of materials already granted. Such ratings may be used to purchase materials up to the amounts authorized on the original application while the decision on an appeal or request for higher rating is pending.

While it has been stated that priorities ratings may ultimately lose their function, ratings still play an important part in obtaining materials.

In addition to the medium of obtaining a higher rating by use of PD-25F, the military arms can assign higher ratings than those granted either through PRP, or through the remaining blanket preference ratings.

The military arms can authorize use of AAA, AA-1, AA-2 or other special top ratings. While the military can increase a rating, the amount of materials allowed to a plant operating under PRP cannot be raised by the military arms.

The PD-25A reporting form is now in the process of revision, and a more simple version will be used for fourth quarter operation.

Allocations Classification is still in an undetermined status. However, while the final purpose and function of the classification has not been decided, Priorities Regulation No. 10 makes mandatory the use of letter symbols and numerals on all purchases down to the retail level.

The Purchasing Agent, in placing orders for materials, is required to indicate the purchaser of the finished product by use of the following letter symbols:

Purchaser	Symbol
The Army	USA
The Navy (includes Maritime Commission)	USN
Lend-Lease	LL
Other foreign purchasers	FP
Domestic purchasers	DP

When making material purchases to fill an order carrying a letter symbol, the symbol must be duplicated on the purchase order.

Use of the letter symbols is a relatively simple phase of the Allocations Classification. The number symbols present a number of complications to the Purchasing

Agent. If the materials to be purchased are going wholly into one end use, the numerical symbol describing that end use is placed on the purchase order.

However, where the purchase is for materials going into several end uses, the Purchasing Agent is required to designate the percentages of the material going into the various end uses—listing the numerical symbols and the percentages for each end use. If this is impractical, the Purchasing Agent is required to designate an approximate percentage by taking the previous month's sales of the products involved as an index

of the proportionate quantities of material going into a specific end use.

The Allocation Classifications are designed to trace the flow of materials to the completely assembled products, so that the numerical symbol should denote the assembled product rather than a sub-assembly or even a complete integral unit. An automotive battery should carry the automotive symbol; ball bearings should carry the symbol of the end use.

This procedure may require some rather complicated calculations on the part of companies whose product is widely distributed through a variety of industries and provision has been made for simplification in those cases where percentages are excessively small. It will require the experience of one reporting period to see where these complications occur and to correct them, for a workable plan is the objective.



Check files to trace the progress and action of a PRP application.

WPB

IS REORGANIZED

FOR NEW PHASE OF WAR EFFORT

Purchasing Division is eliminated in new set-up; emphasis now on allocation and flow of materials, and coordination of industry operations

Chairman Donald M. Nelson of the War Production Board has effected a new alignment of that organization to cope with the conditions and problems of a new phase in our national war effort, and geared to the changed and changing responsibilities of WPB in carrying on the program of production in and for a war economy. While the reorganization has in some respects the aspect of a complete change in the complexion of WPB activities, it is in fact a logical functional development, many of whose features have been clearly indicated for some weeks past. Practically all of the major changes have been in process of development over a period of time, and the new alignment provides a proper administrative machinery and personnel to carry on the work most effectively.

Of particular interest to purchasing men is the elimination of the Purchase Division, which was a key division of WPB throughout 1941 and was the route along which Mr. Nelson himself advanced to the position of supreme responsibility. Organization of the procurement function was a vital step in getting the whole defense program and war program under way, and in making it possible to progress from the relatively small expenditures of the early months to the present rate of nearly a billion dollars a week; to coordinate government procurement with the purchasing activities of our allies and the Lend-Lease program; and to preserve orderliness, overall planning, reasonable economy, and satisfactory delivery schedules in the face of a demand that could otherwise have resulted in industrial chaos, inflationary competition, and a breakdown of supply. With the aid of capable and experienced purchasing men from industry, this phase of WPB responsibility was competently handled with a minimum disturbance to existing procurement agencies and to the enormous benefit of all.

Since the early months of 1942 it has been evident that this particular function could most efficiently be turned over to the procurement divisions of the various services and departments, operating under policies and controls which were by this time well established, and with the personal assistance and direction of men trained in the Purchase Division of

WPB, assigned to strategic positions in those purchasing offices. Browning, MacKeachie, MacPherson, Dexter, Taylor, Jones, Porter, Boyle, and others who had done yeoman service with WPB took over these positions, and the results have been thoroughly satisfactory. The formal elimination of the Purchase Division, which now survives only in the Procurement Policy Division in the section on Program Determination, is merely a milestone designating a job well done as WPB progresses into the new administrative phase.

Similarly the other two divisions of OPM's "three P's"—Purchasing, Priorities and Production—are recognizable in altered form to fit the new need. Now we have the Priorities Administration Division, and a Director General of Operations with appropriate committees and divisions to carry on the work.

Meanwhile, the scope of WPB has broadened with our entry into actual war, to include the closer economic cooperation with our allies and to take over greater responsibilities as an integral part of the grand strategy of the war.

The realignment of organization accomplishes several important purposes:

It clears the decks to make controlling and expediting the flow of materials the Board's central effort.

It brings the Board into closer touch with military and international production requirements, and increases the Board's activities in overall war production strategy.

It strengthens the topside policy, programming and progress-reporting organization of WPB.

It concentrates the operating portions of WPB under one head, and puts increasing emphasis on the work of industry and commodity branches.

It lightens the administrative load upon the Chairman so that he can devote his time to essential policy decisions and to the increasingly important relations of WPB with the other war agencies.

The New Organization

Two Vice Chairmen are provided for in the new set-up. One of these Vice Chairmen is William L. Batt. He will serve, in substance, as Mr. Nelson's

assistant and deputy, helping him in the determination of policies and in the direction of operations, devoting his attention to the whole work of the War Production Board. In order to fill this post, Mr. Batt is relinquishing his chairmanship of the Requirements Committee, although he will continue as a member of that committee.

The other Vice Chairman is James S. Knowlson, formerly Director of Industry Operations. Mr. Knowlson will have responsibility for program determinations. He will serve as Mr. Nelson's deputy on the Combined Production and Resources Board, and will be chairman of the Requirements Committee.

Just as all of the program development work is brought together under Mr. Knowlson, all of the operational work—including the industry and material branches, appropriate bureaus, and the field organization—is brought together under a Director General of Operations. This post has been assigned to Amory Houghton, formerly Deputy Chief of the Bureau of Industry Branches. Thus the programs and policies governing the flow of materials, which are worked out under Mr. Knowlson, are put into effect through the operating units controlled by Mr. Houghton.

A third important phase of the work—checking up to see that programs are properly carried out—is entrusted to a Deputy Chairman on Program Progress. This officer will, so to speak, be WPB's inspector general. Working with the operating units of WPB, with the Supply Arms and Services to which the Chairman has delegated procurement, production and expediting responsibility, and with WPB's Planning, Statistics and other staff divisions, the Deputy Chairman will follow program progress to anticipate bottlenecks, to detect the causes of failure when failure occurs, and to help to see that necessary corrective steps are taken.

One of the most important parts of the new structure is the fact that it gives WPB (1) a closer relationship to the broad strategic picture, and (2) a closer relationship to the other Governmental agencies which have responsibility for various parts of the war program.

As to strategy: The tie-up between WPB and the Combined Production and Resources Board is made close and effective. The work done by the Combined Production and Resources Board can be woven into the operations of WPB in such a way that decisions made by the Combined Board can be translated speedily into programs and action by WPB, and also so that the potentialities of the American economy can be understood by the Combined Board and woven into its decisions.

As to the relationship with other Governmental agencies: There are several agencies to which has been delegated by WPB responsibility for certain parts of the war production program; there are others whose functions naturally supplement the work of WPB. Closer correlation with all of these is sought by recognizing that all are component parts of the general war organization, and by regarding the chiefs of all of these agencies as the War Production General Staff.

There will be close contacts with the members of this General Staff to discuss over-all problems, with especial reference to the discharge of functions delegated by WPB.

Other features of the new organizational arrangement include:

Formation of a Smaller War Plants Corporation, in line with legislation recently passed by Congress. This Corporation, whose head will also serve as Deputy Chairman of WPB on Smaller War Plants, will report direct to the Office of the Chairman. Its directors will be announced within a few days.

Leon Henderson remains as Director of the Office of Civilian Supply, serving as chief adviser to the Chairman on the changing needs of the Civilian Economy in War Time.

Working with the Vice Chairman on Program Determination will be the Procurement Policy Division, formerly the Division of Purchases, under Holder Hudgins, and a new Construction Program Division, which will be responsible for considering and programming all plans for capital expansion, whether military or otherwise, and making sure that facilities expansion projects are in accord with the maximum over-all program.

The Labor Production Division continues under Wendell Lund, and reports directly to the Chairman. Its Labor Advisory Committee becomes the Labor Policy Committee, whose duty it will be to study the problems of labor in production and to advise the Chairman on them.

Working with the Director General of Operations are the following units, other than the industry and commodity branches:

The Conservation Division.

A new Production Engineering Division, to help in the development and wide use of new production methods and techniques in the war program.

A new Facilities Utilization Division, responsible for seeing to it that proper use is made of available productive facilities.

The Inventory Control Division.

The Division of Industry Advisory Committees.

The Priorities Administration Division.

Reporting directly to the Chairman, as units whose services are used by all parts of the WPB, will be the Legal Division, the Office of Organizational Planning, the Office of Information, the Planning Committee, the Statistics Division and the Administrative Division.

1 1 1

YOUNG SCIENTISTS CAN AID WAR RESEARCH

For the first time since the Westinghouse Research Fellowship Plan was inaugurated in 1938, the five Fellowship winners this year may be given definite assignments instead of engaging in original investigations of their own choosing according to Dr. E. U. Condon, associate director of the Laboratories. In the past, they have devoted their entire time to investigations in the realm of pure science. This year, however, all applicants are being asked to indicate the fields in which they feel qualified to contribute to war research.

Reorganization of the war agencies is not a sign of failure or indecision; it reflects the fact that yesterday's problems are not today's problems, and that tomorrow may bring yet another need.



The author, John Horn, with samples of armature connections made with low tin content solders and a motor bearing with lead base babbitt. G. E. is saving about 200,000 lb. of tin annually by such substitutions.

CONSERVING CRITICAL MATERIALS

By the Use of Alternates

How the General Electric Company has
changed designs, specifications, and
processes to save scarce materials

By JOHN HORN

Engineering General Department
General Electric Company

The degree of fulfillment of the war production program depends in large measure upon industry's ability to find and adopt alternates for a major portion of materials which heretofore have been commonly available in ample quantities.

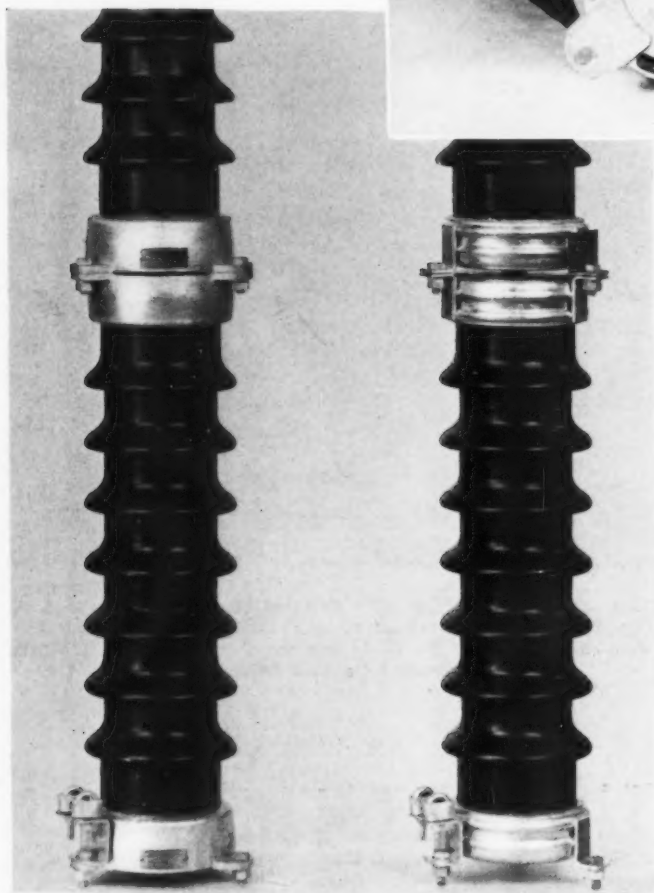
Coming, as it does, at a time when the call for production of tried, as well as of new, designs involves quantities of virtually unheard-of magnitudes, the problem represents a severe challenge. The resultant

Paper presented before the Northeastern District Meeting of the American Institute of Electrical Engineers at Schenectady, N. Y.

complications are baffling but the two-fold job must be executed, and beyond doubt it will be done by the application of engineering ingenuity and wholehearted co-operation. This seems undisputable because what is more truly an engineer's task but an everlasting endeavor to devise ways and means of meeting new requirements?

For the purpose of this discussion it may be interesting to trace the procedure adopted in the General Electric Company with the aim of not only meeting the various requirements as laid down in the conservation orders of the WPB but even to go a step farther

Below: Parts of lightning arrester devices formerly made of heat-treated aluminum castings (left), and to a much smaller extent of sheet and bar stock, have been changed to hot-dip galvanized steel in some instances with an etching-and-paint finish (right). Result: about 100 tons of aluminum saved annually.

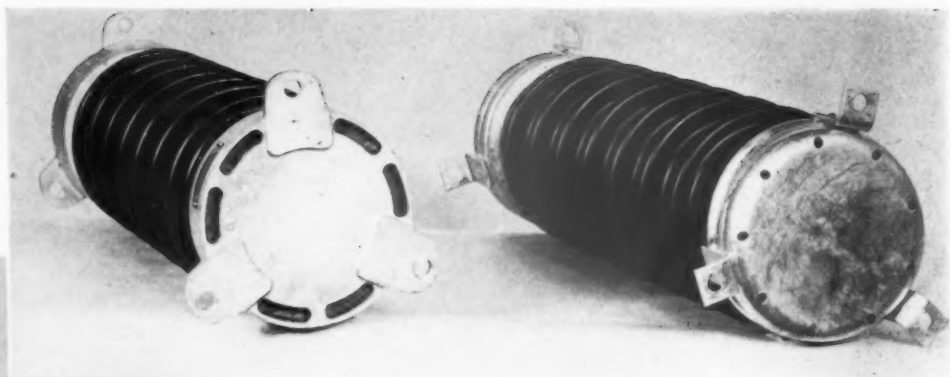


so as to serve the national interest to the very fullest extent.

Compliance Procedure

The procedure starts at the arrival of the conservation orders issued from time to time from Washington. As soon as the orders are received at the main office of the Company they are reviewed by the general manufacturing department, in collaboration with the central procurement and engineering departments. This review aims principally at interpreting the orders in the terms of the Company at large. Accompanied by an interpretation of this nature the orders are immediately passed on to the heads of production and engineering in the administrative offices of the various plants.

At this stage they become subject to a second review by these production and engineering representatives who determine the effect of the orders upon the operations of the particular plant and then arrange to pass the orders along to those departments that will be specifically affected. Here again, a production and engineering representative go over the order jointly and decide upon the action that will be necessary to comply with the terms of the order and also to go beyond that point wherever it is feasible to do so in the interest of the general material situation in the country. In cases



End view of lightning arrester units, showing (left) aluminum fitting, and (right) steel fitting.

where the orders involve particular hardships which cannot be overcome immediately, the departmental representatives proceed to prepare the appeals in accordance with the regulations of the order.

These appeals pass back through the same channels through which the orders reach the individual departments. In the first instance the appeals are reviewed from the viewpoint of the common interest of the specific plant and in the second instance from the standpoint of the Company as a whole. Whenever two or more departments or plants are affected by the order an attempt is made to co-ordinate the necessary appeal so as to present to the WPB a unified picture that will indicate the over-all needs of the Company in respect to relief.

It may at first appear that the outlined procedure is a somewhat complicated one, but on closer analysis it will hardly be found much different from that followed by smaller individual concerns. It must be remembered that the Apparatus Division of the General Electric Company, with which this review deals, is composed of departments which, in several instances, produce similar or parallel lines of apparatus that differ chiefly in size. With this situation it has proved equally necessary and desirable to add the co-ordinating effort that is provided for by going through several central points in handling both incoming regulations and outgoing appeals. Our experience has definitely indicated that it is essential both to us and to the WPB to handle the conservation orders and the matters connected therewith in a truly comprehensive fashion of this nature.

Conservation Effort

In the case of materials which are commonly used throughout the manufacturing units as a whole, the actual conservation effort is usually organized under the leadership of one or more specialists from the metallurgical staff, or under the guidance of one of the existing metallurgical and material committees, of which a dozen or more have been operating over a period of years as advisory and standardizing groups.

These individuals or committees survey the general situation as regards a particular material or as regards available alternate materials for the same, and in that survey collect all the available information with particular reference to characteristics, availability, and general application data. At the same time, tests and experiments are initiated wherever necessary to try out new or modified materials with special emphasis

to their adaptability for employment in existing designs and for use with available manufacturing equipment. Also, the various departmental or plant representatives, the interested engineers, and the manufacturing personnel concerned, are contacted and arrangements are made for whatever local or specialized action may be required to reach the desired results as expeditiously as possible.

As soon as the general survey is completed and the required basic information is obtained, the central coordinator arranges to go over local problems on location, to compare notes with his collaborators, and to promote decisions for those changes that hold the best promise from the viewpoints of procurement, manufacturing, and engineering.

Then follows the initial introduction of the material selected in the described process and this sometimes requires execution on a trial basis to gain actual usage experience before a complete switchover is made.

Classes of Conservation

In general, conservation may be resolved into several distinct classes along the following lines:

1. Conservation by straight substitution involving a direct change from one material to another without any significant modifications in design or in application. A simple example would be a change from cast tin-base to tin-free bronze, or also from primary to secondary aluminum. In either of these instances, the attainable characteristics and properties of the alternate material may be sufficiently close to those of the original material so that a part or product of the latter may be replaced directly with its equivalent produced from the alternate material without any changes in manufacturing except perhaps for some modification in the casting procedure.

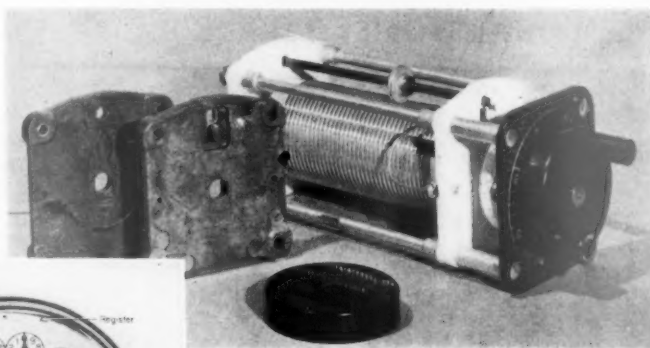
2. A second class of conservation can be visualized to involve a reduction in the quantity of material used. The prob-

Below: 4½-foot fan blade for cooling tower fan is now molded of laminated Textolite.

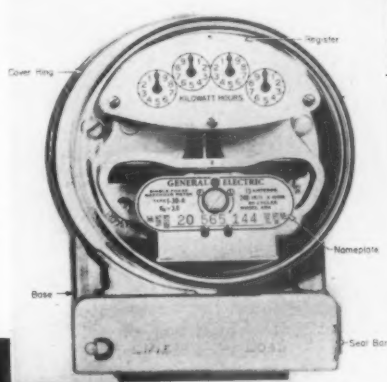


lem here is often largely one of finding new ways of using and fabricating the material in question. Take the case of tin-base babbitt where a substantial reduction in tin can be achieved by changing to thin-walled babbitt designs. Also in this particular instance the principal difference between the use of new and old constructions may lie in a change of casting technique. Another example of the same class may involve the use of the same material as before, but to do this from the viewpoint of material scarcity rather than from the standpoint of ease and economy of manufacture. Parts manufactured from sheet material may fall within this group and the question may resolve itself into a different laying out of the pieces possibly with resort to welding of multiple pieces into the final shape.

3. A third class of conservation may take in the change to alternates with a consequent need for changes in design and most likely also in manufacturing. An obvious example of this character would be a



Above: Inductor for a radio transmitter. Beside it (left) are Mycalex pieces and Textolite cover substituted for steatite and aluminum.



Center: In the watt-hourmeter, steel replaces punched and stamped aluminum parts for the cover ring, register, seal bar, bayonet clips. Nameplate is made of fiber instead of aluminum. Die-cast zinc replaces die-cast aluminum in the base.

change from aluminum to steel construction. If this concerns a sizeable assembly, a complete redesigning job is apt to be involved and besides, an extensive change in manufacturing, both in method and equipment, will usually be required. This type of conservation therefore commonly represents an undertaking of such a scope that the time and effort required for its execution all the way from the designing board down to factory floor, may be of almost alarming proportions. At the present time with its critical material situation there may nevertheless be no other choice but to proceed with the sought conservation even at the expense of a considerable tying-up of man-hours and equipment that could otherwise be used to good advantage for other work.

Effect on Material Specifications

There are of course other ways in which the problems of conservation may be grouped, but the foregoing classification broadly covers the most common situations that have arisen in G. E. organization.

To insure quality in its products and consistency in

manufacture, it has been the standard practice in the G. E. Company through the years to purchase materials to definite specifications. This is still the endeavor, and with the present increasing removal of many of the existing G. E.-approved materials to a status of non-availability or high scarcity, it often becomes necessary to provide new specifications for alternate materials practically over-night. The problem thus introduced is quite extensive, but close contact between our engineers and metallurgists on the one hand, and the procurement specialists, vendors, as well as agencies of the Government and trade on the other hand, has proved to be of inestimable advantage in this connection.

In many instances the issuing of material specifications in advanced form to take into account anticipated developments in the material field has been found a very practical solution. Measures of this nature facilitate procurement and avoid unnecessary delays of shipments from suppliers who would otherwise be bound to specifications that cannot be met in the present scarcity situation. This is a point that deserves more general recognition on the part of every purchaser of materials to specifications in all fields.

Substitutions Made

At a fairly early date our engineers and metallurgists foresaw the possibility of a severe shortage of some of the materials which now have a high scarcity standing. This is particularly true as regards aluminum, and already in the fall of 1940 certain steps were taken to keep aluminum out of new designs and to replace aluminum in any re-designing effort on already existing apparatus. As one of the first results of this action the household garbage disposing unit, known on the market at the Disposall, was changed over from aluminum to steel construction some year and a half ago. This was accomplished with improvements in characteristics, without loss in appearance, and with a cost saving as well.

Somewhat later, refrigerator ice trays were changed from aluminum to copper, and later to steel, and at the same time stainless steel for refrigerator evaporators was replaced by carbon steel with porcelain enamel coating. This change falls within a group of substitutions for which no particular gains can be claimed aside from the saving of a very scarce material, but in turn the change did not involve any new problems as it represents a reversal to a construction that has proved satisfactory in actual service for a number of years in the past.

With the extremely high rate of armament production which we have been confronted with in the General Electric Company in the past twelve to eighteen

months, practically every effort has been needed to meet the steadily expanding production schedule. This has left little time for the preparation for changes to new or untried materials on the scale required at the present time because of the very general material shortage with which industry has been faced overnight, figuratively speaking. Nevertheless, the list of accomplished substitutions is a long and impressive one, so much so that only a few examples taken at random can be included in this review.

A glance of the latest compilation of the relative availability of materials as issued by the conservation and substitution branch of the WPB April 17, shows

the following 15 materials in the group of some 67 materials which are designated as those most vitally needed for war purposes and hence not generally available for other needs.

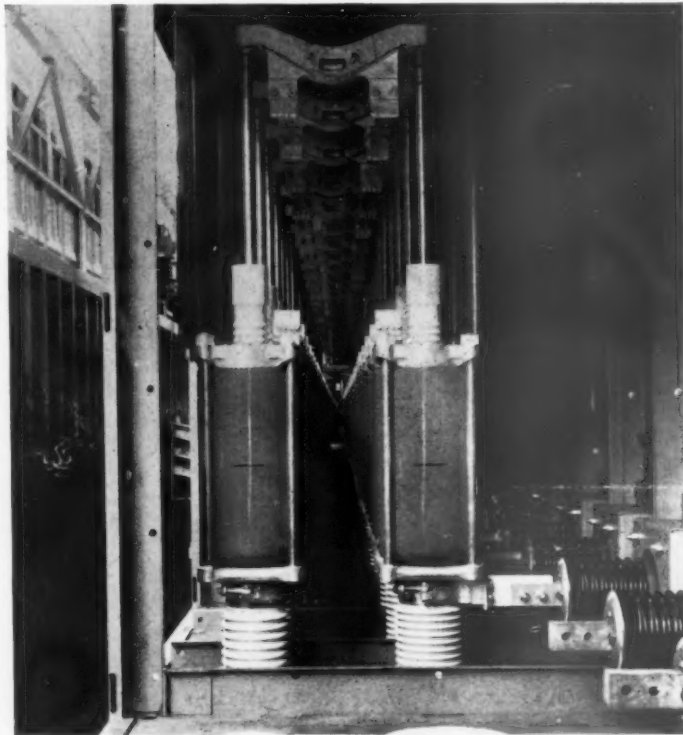
These 15 materials are: *alloy steel*, including a number of the most prominent alloying constituents of same; *aluminum*, including scrap; *chromium*; *copper*, including scrap; *magnesium*; *nickel*, including scrap; *tin*, including tin plate andterne plate; *tungsten*, including tungsten carbide; *formaldehyde*; *phenol-formaldehyde resins and plastics*; *shellac*; *toluol*; *tung oil*; *mica splittings*; *rubber*, including crude, latex, chlorinated & synthetic.

All of these materials have a conspicuous place on the long list of materials which have been used freely heretofore in

G-E design and production. Some of these materials are more easily replaceable than others, and this is true especially of those that are used for structural purposes as contrasted with operational functions. It is but natural therefore that the conservation effort has been most effective in eliminating or reducing the consumption of these structural materials.

Substitutes for Aluminum

Except for alloy steel, aluminum stands foremost among those of the foregoing materials that have usage principally in structural members, not considering the application of aluminum as conductors in cast squirrel-cage motor rotors, in large rotating apparatus windings, and in busbars. Its use in structural parts is largely predicated upon its light weight, its corrosion resistance, and the relative ease with which it can be formed or cast into the desired shape. For most of its structural uses in sheet form or in rolled shapes the commonly applicable substitute is steel, whereas when it comes to die castings, zinc is taking more and more of its place although bronze also figures as its substitute. To mention but an example, the latter is true in the case of brush holders where zinc tends to lead to the troubles of sticking brushes. Re-



Using cast or fabricated steel in place of aluminum alloy for crossheads (top center) of oil circuit breakers like these conserves about 75,000 lb. of aluminum yearly.

cently, very promising fabricated steel brush holders have also been produced as replacements for aluminum holders.

The largest reduction on record to date in the General Electric Company, in the effort to make substitutions for aluminum, covers some 5 million pounds of aluminum which were eliminated in one year's time prior to December 1941 from the production of household refrigerators—a now extinct line. Other sizeable reductions in the yearly consumption of aluminum include 1,300,000 pounds in meter production, 550,000 pounds in industrial control gear, 360,000 pounds in street lighting equipment, 200,000 pounds in lightning protective devices and 165,000 pounds in switchgear construction. A list of similar reductions in the manufacture of other lines of apparatus would be a lengthy one but the foregoing may be sufficient as indications of what has been accomplished in a serious effort to conserve aluminum by substitution.

Turning back to the reduction accomplished in the industrial control branch, the largest item by far takes in structural members and enclosing cases which have been changed over mostly to steel. A few of the other major items take in cast aluminum bases and bearing brackets where zinc has figured prominently as a replacement material. It may be interesting to note that some 65 to 70 thousand pounds of aluminum were used in this line of production in the form of aluminum paint and sheet stock for name-plates, both of which uses have been completely eliminated, the former by a gray lacquer and the latter mostly by zinc.

The largest aluminum consuming item in the meter production prior to the substitution covers die-cast bases which have now been replaced by die-cast zinc with a saving of some 275 tons of aluminum a year. The second largest saving is achieved by eliminating aluminum from cases and boxes and the third largest reduction by changing from punched and stamped aluminum parts to steel (or in a few instances to brass) for cover rings, bayonet, clips, registers, seal bars, etc. In substituting fiber for aluminum in meter nameplates a yearly saving of some 12 tons of aluminum has resulted. The total saving of aluminum achieved by eliminating its use in nameplates on all G.E. apparatus is of the order of 175 tons a year. The most commonly used alternates for aluminum in nameplates today take in a lead-base alloy, cast iron, etched zinc, fiber and various synthetic materials, all depending upon the size of the plate, its mounting location and the end location of the particular apparatus.

The reduction of aluminum consumption in street lighting equipment is traceable largely to the use of malleable iron, steel and bronze for housings, brackets, hangers and the like, but a considerable quantity has also been eliminated otherwise, as for instance by substituting silvered glass reflectors for anodized aluminum. The parts of lightning arrester devices that were formerly made of heat-treated aluminum castings, and to a much smaller extent of sheet and bar stock, constitute fittings and casings which have been

changed to hot-dip galvanized steel in some instances with an etching and a paint finish. Some 100 tons of aluminum have been saved by the indicated substitutions.

Prior to the present conservation effort, a large number of parts such as contact arms, cross heads, supports, frames, hooks, etc. of circuit breakers, and covers, frames and rotors of relays, were made exclusively of aluminum in Switchgear Division. These are mostly aluminum alloy castings whose light weight was particularly advantageous for parts which must be set in motion and kept moving to get fast breaker operations. In some cases fabricated steel parts have been substituted without any increase in weight and thus without a change in the operating speed or in the power required to maintain this speed. In other cases, the substitution has involved castings or fabricated structures of increased weight so that a subsequent change in springs and other parts of the mechanism has been necessary to attain the required motion.

At this point it may be appropriate to mention an innovation in manufacture which has not directly reduced the amount of material required but which has nevertheless relieved the stress of procurement of a critical material. Reference is made to a method of assembling flat bars into angle or box form for use in place of structural shapes and channels for high-current busbars. The new method is estimated to be more efficient and less costly than the former practice.

Also, in the change from aluminum to zinc it has been experienced in various connections that where zinc is used either as a body metal or as plate finish there is a tendency for a whitish powder to form under certain conditions of confinement and moisture. This formation may be sufficient to interfere with the proper functioning of small parts and also to result in the lowering of the electrical characteristics. Work is now in progress to eliminate this possible source of trouble by a suitable treatment of the zinc.

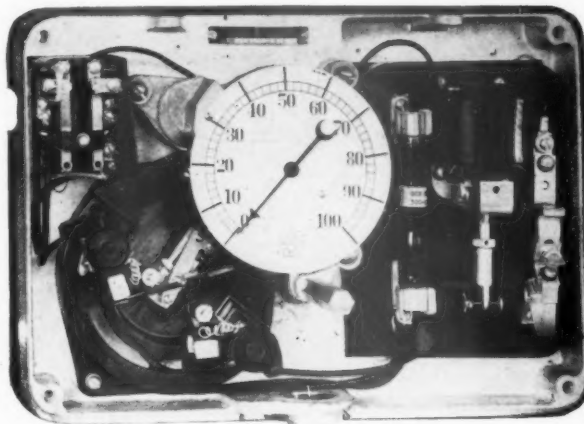
Saving Tin

Among the remaining metals named as random selections from the WPB listing referred to, tin comes next to aluminum in respect to quantities consumed for

structural use. Its three main uses divide into tin-base bronzes, babbitts, and solders. To date most progress has been made in reducing the tin consumption in the two latter classifications, although the field of bronzes offer a very promising opportunity for sizeable overall savings of tin. The principal reason for the less extensive progress made with the reduction of tin in bronzes appear to be a lack of broad foundry experience with most of the low-tin and tin-free compositions which can be used as alternates. In some quarters also the "zinc shakes" which are en-

countered in casting zinc containing alloys figure as obstructions that can be overcome only by improved ventilating provisions which are not always readily installable.

The composition used in the G.E. standard babbitt



Pressure governor with an aluminum base is now mounted within a steel shell instead, saving about 17,000 lb. of aluminum yearly.

for rotating apparatus bearings over a period of years is one containing 83⅓% tin. Since the beginning of January 1942, as a result of the tin conservation order M-43-a of December 31, 1941, detailed investigations and tests have been made at each of the four G.E. Works building rotating apparatus to find a lead-base composition that could be adopted to replace this former tin-base alloy. This work has entailed a large number of tests and trials, as well as consultations with, and visits to, babbitt manufacturers who figure as the principal suppliers to industry at large.

The conclusion from this activity is that a lead-base babbitt containing 82½% lead, 15% antimony, 1% arsenic, 1% tin, 0.5% copper, is a satisfactory alternate for use in centrifugally cast sleeve bearings. On that basis, the manufacture of this type of bearing in our various motor departments has been changed over in part, and is in the process of change-over for the remainder, to the use of this lead-base alloy. The resultant saving of tin may conservatively be estimated to be of the order of 200,000 pounds of tin per year at the present rate of production. Stationary-cast bearings (cast-iron shells with dovetail anchorage) involve a problem of proper pre-tinning for the use of this same babbitt composition. Active work on this problem and some trial productions are now in progress.

For larger bearings as required for power-plant turbines and generators, the conservation effort centers around a redesign to use much less material by changing to thin-wall, bonded bearings in contrast to the cast-iron anchorage type.

Less Tin in Solders

For general purpose soldering, 40% tin—60% lead has been the popular composition throughout the Company in the past although other higher tin-content materials have also been used to some extent for general purpose work. As an alternate for these materials several compositions of lower tin content have been proved applicable. Some of these, such as the 20% tin—1% silver—79% lead have been found adoptable with but minor changes in technique, temperatures and operating schedules. Others, such as the 97½% lead—2½% silver composition, have not proved immediately applicable for use with the available soldering irons and also require modifications in technique and incur lengthened operation schedules. To gain further experience, however, a number of compositions between the 20% tin solder down to the no-tin materials such as the 97½% lead—2½% silver have been placed in operation for a final selection of specific varieties to meet the particular requirements of each operation. As an indication of the progress that has been made in this connection, 10,000 pounds of the 20% tin—1% silver—79% lead composition in both rosin-core and solid form has recently been stocked at one of the Company's Works for replacement of the 40-60 composition.

As for electrical joints, particularly those involving reasonably heavy conductors for which 100% tin has been used in the past as a standard to produce strong reliable connections, changes have been made to the use of silver brazing with the exclusion of tin. A typical example covers commutator riser joints on large machines.

Another case of a change from soldering to brazing is represented by transformers where all the copper conductors including application of terminals, have been brazed for some years because of the superior quality of joints obtained by this method. About 60 different types of joints and connections in electrical conductors are designed to be heated with carbon blocks and to be made up with Silfos. Portable brazing equipment (brazing tongs) permit terminals to be applied in almost any locations.

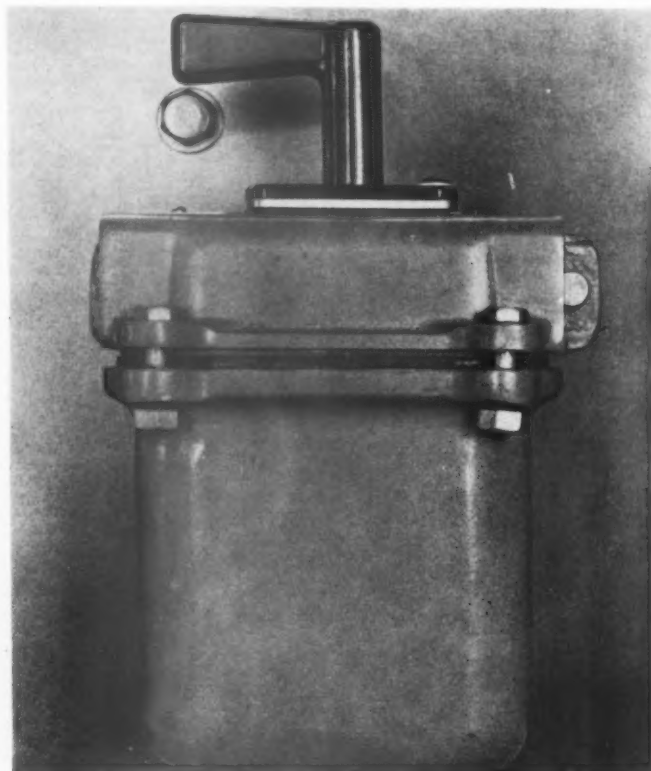
In the use of soldering pots for hot dipping, good results have been obtained with 90% lead—10% tin, and experience is rapidly being gained with this and similar low-tin content materials in a large number of soldering pots through the various plants. A complete changeover to the use of these new materials will be effected in the near future.

As regards all other solders of tin contents that exceed the 30% tin limit, a similar status exists. With but a few exceptions changes have been made to low-tin compositions which are being tried out in the various uses to establish the very lowest limits that we can go to in regular production.

Problems to be Solved

There are, however, a few exceptions on which we have had no success to date in the search for replacement materials. One of these takes in the soldering of leads to commutators where pure tin appears to be the only material that will give safe joints under the temperatures reached in actual operation, particularly in the case of small high-speed armatures. Because of the centrifugal force, the solder tends to be thrown out from the joints at relatively low temperatures whereas pure tin remains solid and does not fail in this respect until the melting point of tin is reached.

Further, there are several sealing operations on two or three different products which we have not as yet been able to produce with solders of less than 60% tin. One of these operations concerns the sealing of capacitor cans by a dipping method to produce an ab-



Side close-up of a control switch in a water-tight housing. Tank and cover were previously made of aluminum alloy; malleable iron, galvanized, is now used instead as a production material.

Ferrules at each end of current limiting fuses in a number of sizes are made of alternate material without any change in design. A tin-copper-antimony alloy has been replaced by a lead-base antimony composition.

solutely tight seal without which a satisfactory product is not obtained. Several new compositions are now on production trial, and a study has been made of a different method of sealing. The latter change would require several special machines which are not readily available.

Wiping of cable joints represents another operation for which a definite alternate for the 40-60 solder used in the past has not yet been found. The indications are that tin solders with less than 38% tin cannot be worked in a practical way to produce reliable non-porous wipes. On a trial basis good results have been obtained, however, with certain tinless solders and these are now being further explored.

On the whole, the substitutions that have been made, and those that will be made in the very near future, account for tin savings of more than 50% of all the tin that would be required if these alternates were not in the picture.

The following is an interesting test result arrived at in the investigation of low-tin solders. Having observed that lead-silver solder was much inferior to 60-40 tin solder when subject to vibration, the question arose as to whether a terminal soldered to cable with the lead-silver composition would be weaker than the cable itself. This question was checked with cables having the terminal at one end soldered with tin and the other with lead-silver. Completed, these cables were vibrated some 550 thousand times and in each case the cable failed approximately $\frac{1}{2}$ in. from the terminal, indicating that the lead-silver solder is fully satisfactory for soldering terminals to cables that will be subject to vibration.

Alloy Steel and Copper

Going back to the metals extracted from the WPB listing in the foregoing, alloy steel and copper, of course, are both very large-usage materials in the General Electric Company. As for alloy steels, they can hardly be discussed in a general review of substitution of the present character, because the varieties are all too numerous and any of these may in turn be replaceable by several other compositions, all depending upon the particular application. It will suffice to say, therefore, that all applications of these alloys receive individual attention from time to time with a sincere aim towards conserving critical ingredients wherever possible.

Copper holds a unique position of importance to the present status of electrical engineering as a whole, and wherever it serves as a conductor it can only be replaced in rare instances. Any conservation effort on copper therefore reduces itself almost entirely to a search for the most economical utilization of the very smallest quantity of copper that will do the job. Prior to the present material shortage copper did, however, have numerous applications for nonconductor uses. All of these have been carefully investigated and in a good many of them copper has been replaced with steel, malleable iron, terne plate, brass, bronze and zinc. Wherever steel is found to be an applicable replacement material in such cases, the principal problem appears to be one of providing a sufficient protective coating to counteract corrosion. Use of such coatings in turn may introduce a problem of insuring against the formation of chemical products that will be harm-



ful to the metal itself or to the proper functioning of the particular apparatus.

Further, a small percentage of copper added to steel has proved a valuable means for improving steel's resistance to atmospheric corrosion as much as three to five times. These uses of copper have been eliminated by resorting to other means of protection.

There are also a number of applications of copper and copper alloys in connection with transformer and oil circuit bushings and the like where it is used because of its nonmagnetic properties to avoid stray currents and objectionable local heating. In the attempt to conserve copper in such uses, the expediency of moving the parts far enough away from the electrical conductors to prevent the undesirable effect has been applied. In several instances, however, this remedy has proved to increase the size of the complete apparatus to such an extent that the over-all quantity of copper and other critical materials consumed has proved to increase.

The statement in the foregoing to the effect that copper for conducting purposes can be replaced only in rare instances may shortly need to be modified. The fact in this connection is that transformers are on order in which 150,000 lb. of silver will be used in place of the copper that would normally be employed. The experience with these units and with silver busbar installations in certain industrial plants may disclose interesting possibilities.

Chromium and Nickel

Of the remaining scarce materials comprising the 15 random selections named in the foregoing, chromium and nickel have a special importance in their combination as an electrical resistance material used extensively in control-device resistors and heaters. In some cases where the resistor forms an external part of the device, and where sufficient space is available, nichrome wire can be conserved by a change to cast-iron grid resistors. Many applications remain where the resistor or the heating unit forms a compact ele-

ment which in turn is a component part of a complete assembly, and for elements of this nature the search to date has not yielded a practical alternate material. Experiments and trials are continuously underway aiming at the production of a suitable alternate for nichrome wire for these applications.

Non-metals

The nonmetallic materials named in the foregoing WPB grouping of scarce critical materials, are all components of electrical insulations used extensively in G.E. products. Among these nonmetallics, *formaldehyde* which is required for the manufacture of coil treating varnishes and allied materials, is one for which no substitute has been found. Conservation as regards it is limited, therefore, to the most efficient use of it.

Tuluol is an ingredient of many varnishes of fast-drying characteristics serving as stickers, binders or adhesive agents, for instance in built-up mica, and treating materials. Between 100 and 150 such formulations required *tuluol* prior to 1941 but its use in these have now been reduced to such extent that the total consumption is down to less than 50% of the quantity formerly used. The principal substitute is the petroleum derivative known as Solvesso 1.

Tung oil is also one of the important ingredients in certain insulating varnishes; for example, those that find application as cloth impregnating materials. *Oiticica* oil has been a preferred substitute for tung oil but recently its availability standing has approached that of tung oil. A number of other oils have also been found practical. The scarcity of tung oil has brought about the development of synthetic varnishes which do not require tung oil. The net reduction in the requirement for tung oil is of the order of 35%.

The present critical situation as regards *shellac* supplies has been anticipated for some time, with the result that for certain uses practical alternates are available. *Shellac* remains, however, the only known material that forms a satisfactory binder in high-class, built-up mica and in high-voltage insulating cylinders. For the latter, phenolic resins have proved applicable in place of *shellac*, but with the present shortage of such resins other materials are needed and they are being introduced on a trial basis just as soon as they come to light. In a variety of other applications where *shellac* has formerly been used synthetic materials are being introduced.

Mica, with its old standing as the only useful ma-

terial for certain insulation uses in electrical apparatus construction, is still an unmatched material for applications where its outstanding characteristics are actually needed. The grades of mica generally suitable for electrical insulation are the imported varieties from India and Madagascar, but considerable quantities of mica from deposits in both North and South America are now finding use. The principal problem in that connection consists in obtaining satisfactory machine splittings that will compare with the hand-split imported grades. The efforts of conservation as regards the present stocks of high-grade imported mica centers around the use wherever possible of mica from the deposits on the American continent and thus to reserve the imported grades for the higher requirements. Otherwise, mica is being conserved through the use of improved manufacturing methods both in the production and application of mica, and also by reducing the thicknesses of mica to the amounts actually needed where formerly greater thicknesses may have been used as an additional safeguard. In one particular application such a change from 1/32 to .02 in. produced a saving of 3800 pounds a year.

Rubber Insulation

The largest usage of rubber in G-E products comprises insulated wires and cables. Much work has been done in recent years on the problem of using reclaimed rubber in place of crude and a stage has been reached where reclaimed rubber may be applied in practically the same manner as crude rubber for most insulated wire applications. Work is continually being done also to facilitate the use of the various synthetic grades. One means of conservation, which is not being overlooked in cable manufacture, is that of decreasing the wall thickness of the rubber insulation wherever possible.

In closing, the subject of using alternates for the conservation of scarce materials is much too comprehensive to be covered by a review of this character. Therefore, like the conservation job itself, this presentation is by no means complete. It is hoped however that the included remarks bear definite indications of a conscientious conservation effort and also that they have pointed to ways and means for reducing the consumption of materials whose continued availability largely depend upon skillful adjustments to the present situation. This is an engineering problem whose successful solution will promote our nation's welfare and interests, and will definitely help to shorten the war.

SUBSIDY FOR OIL TRANSPORTATION

An arrangement has been made between the Defense Supplies Corporation and executives of the petroleum industry, to shift the burden of increased transportation costs from consumers to the federal government through a subsidy to defray the abnormal expenses of moving petroleum products to East Coast users from the Middle West and Southwest. This financing may involve the expenditure of 250

million dollars. It will be limited to shipments for vitally essential needs, and is not expected to relieve rationing quotas on gasoline, but may rescind a part of the price increases authorized by OPA earlier this year. It is expected that shipments from refineries and pipeline terminals will be greatly stimulated, perhaps to the extent of 200,000 barrels.

THE MARKET PLACE



Quotations on basic materials for
carload or mill shipments, with
comparative prices quoted one
month ago and one year ago

(*denotes ceiling price)

	July 21 1941	June 23 1942	July 27 1942
ACIDS			
Acetic, 28%, cwt.....	3.18	3.38	3.38*
Muriatic, 18 deg., cwt.....	1.50	1.50	1.50
Nitric, 36 deg., cwt.....	5.00	5.00	5.00
Oxalic, Works, cwt.....	10.75	11.25	11.25*
Phenol, Works, cwt.....	14.25	14.25	14.25
Sulphuric, 66 deg., ton.....	16.50	16.50	16.50

	July 21 1941	June 23 1942	July 27 1942
Salt			
Salt peter crystals .....	.091	.092	.092
Soda			
Ash, 58%, light, bulk, cwt.	.90	.90	.90
Caustic, 76%, solid.....	2.30	2.30	2.30
Sal, Works, cwt.....	1.10	1.10	1.10
Sodium			
Bicarbonate, cwt.	1.70	1.55	1.55
Tri-Sod. Phosphate, cwt..	2.35	2.90	2.90
Silicate, 60 deg., cwt.....	1.65	1.65	1.65
Sulphur, Comm., cwt.....	1.60	1.60	1.60



BUILDING MATERIALS

Brick, N. Y. dock, per M....	12.00	13.00	13.00
Cement, f.o.b. plant, bbl.....	2.15	2.15	2.15
Glass, single B, per box.....	2.64	3.14	3.14
Lime, pulv., N. Y., per ton...	17.00	17.00	17.00
Nails, wire, per keg.....	2.55	2.55	2.55*
Oak flooring, rep M. ft.....	84.00	85.00	85.00
Southern pine, K.C., per M ft.	30.69	52.50	52.50*



COAL & COKE

Anthracite, stove, mines.....	6.35	6.75	6.75*
Bituminous, Cleaf, mine run..	2.70	2.70	2.70
Beehive Coke, Connellsville..	6.00	6.00	6.00*
By-product Coke, Newark....	12.45	12.45	12.45*

CHEMICALS

Alcohol, denatured, gal.....	.38	.65	.65*
Alumina Sulf., Comm., Works, cwt.	1.15	1.15	1.15
Ammonia, aqua, 26 deg., drums .....	.02¼	.02¼	.02¼
Arsenic			
White, cwt.	3.50	4.00	4.00
Red, cwt.	nom.	nom.	nom.
Barium			
Chloride, ton	77.00	77.00	77.00
Carbonate, ton	56.50	56.50	56.50
Benzol, pure, gal.....	.14	.15	.15
Borax, powd., ton.....	48.00	50.00	50.00
Chlorine, cwt.	1.75	2.00	2.00
Formaldehyde, lb. ....	.05¼	.05¼	.05¼*
Glycerine, drums, lb.....	.14½	.18¼	.18½*†
Lead, acetate, white, broken cwt.	11.00	13.25	12.50 ↓
Nickel sulphate			
Double .....	.13	.13	.13
Single .....	.13	.13	.13
Potash			
Caustic, solid .....	.06¼	.06¼	.06¼
Permanganate .....	.20½	.20½	.20½
Sal Ammoniac			
Gran. white, cwt.....	4.50	4.50	4.50
Gran. gray, cwt.....	5.75	5.75	5.75

FERTILIZERS

Muriate potash, 62-63%, per unit K 20 .....	.53½	.53½	.53½
Sulphate potash, 90-95%, bags			
Nitrate soda, bulk.....	36.25	nom.	nom.
Sulphate ammonia, dom., bulk.	27.00	27.00	27.00
Steamed bonemeal, 3 and 50 per ton	29.00	30.00	30.00
	37.50	37.50	37.50

GRAINS

Barley, malting, bu.....	.73½	.86½	.87¼ †
Corn, No. 3, yellow, bu....	.72½	.84½	.86½ †
Oats, No. 2, white, bu.....	.33¼	.50½	.49 ↓
Rye, No. 2, Western, bu....	.71¾	.80½	.83½ †
Wheat, No. 2, hard winter, bu.	.94½	1.11¼	1.08½ †
Flour, spring patents, 196 lbs.	5.95	5.95	6.15 †

HIDES

Light native cows, lb.....	.15	.15½	.15½*
Heavy native steers, lb.....	.15	.15½	.15½*
Calfskins, 5-7 lbs., per skin..	nom.	1.65	1.65*

IRON & STEEL

	July 21 1941	June 23 1942	July 27 1942
Pig iron, foundry No. 2.....	24.00	24.00	24.00*
Pig iron, basic, valley.....	23.50	23.50	23.50*
Cast iron pipe, New York....	52.20	52.20	52.20*
Forging billets, Pittsburgh base	40.00	40.00	40.00*
Sheet bars, Pittsburgh base...	34.00	34.00	34.00*
Wire rods, Pittsburgh base...	40.00	40.00	40.00*
Cold rolled sheets, cwt., Pitts-			
burgh base	3.05	3.05	3.05*
Hot rolled annealed sheets,			
cwt., Pittsburgh base.....	2.10	2.10	2.10*
Cold rolled strips, cwt., Pitts-			
burgh base	2.80	2.80	2.80*
Hot rolled strips, cwt., Pitts-			
burgh base	2.10	2.10	2.10*
Tin plate, cwt., Pittsburgh base	5.00	5.00	5.00*
Bars, cwt., Pittsburgh base...	2.15	2.15	2.15*
Shapes, cwt., Pittsburgh base.	2.10	2.10	2.10*
Bright wire, cwt., Pittsburgh			
base	2.60	2.60	2.60*
Ground shafting, cwt., Pitts-			
burgh base	2.65	2.65	2.65*
Rails, ton, Pittsburgh base...	40.00	40.00	40.00*



METALS, NON-FERROUS

Aluminum, virgin ingots.....	.17	.15	.15
Antimony, American, spot...	.14	.14	.14
Copper			
Electrolytic .....	.12	.12	.12*
Chromium, 97%, spot.....	.84	.84	.84
Lead, E. St. Louis.....	.057	.0635	.0635*
Nickel, ingot .....	.35	.35	.35
Quicksilver, flask	190.00	199.22	199.22*
Silver, bars, N. Y., per oz....	.3434	.3518	.3518
Tin, Straits, spot.....	.53	.52	.52*
Zinc, E. St. Louis.....	.0725	.0825	.0825*

METAL PRODUCTS

Copper, wire, bare, cwt. ..	15.75	15.375	15.375
Yellow brass sheets, high ..	19.48	19.48	19.48



NAVAL STORES

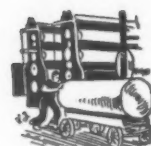
Turpentine, gal. ....	.57	.60 1/2	.64 ↑
Rosin, Grade B, cwt.....	2.70	2.76	3.41 ↑

PAINT MATERIALS

White lead, dry, basic, carbon-			
ate .....	.07 1/2	.07 1/4	.07 3/4 ↑
Carbon black .....	.03425	.03625	.03625
Shellac, orange .....	.28	.36	.36*
Linseed oil .....	.113	.139	.135 ↓

PAPER

News, roll, ton.....	50.00	50.00	50.00*
Book, M. F., cwt.....	6.90	7.50	7.50*
Wrapping, Northern, cwt.....	5.25	5.50	5.50*
Wrapping, southern, cwt.....	4.50	5.00	5.00*
Wrapping, manila, jute, cwt...	8.75	10.50	10.50*
Chip board, No. 1, ton.....	42.50	45.00	45.00*
Wood pulp, mech., ton.....	36.00	46.00	46.00*
Wood pulp, sulph., No. 1, cwt.	3.17 1/2	3.17 1/2	3.17 1/2*



PETROLEUM

Crude, Mid-Continent	1.17	1.17	1.17*
Crude, Penna.	2.30	2.55	2.55*
Gasoline .....	.08	.092	.117* ↑
Bunker Oil C.....	1.35	1.80	1.80*
Kerosene, 41-43 grav.....	.052	.057	.077 ↑
Penn. bright stock, light, 25			
P. T. ....	.33	.36	.36
Penn. cylinder oil, 600 flash..	.22	.26 1/2	.26 1/4



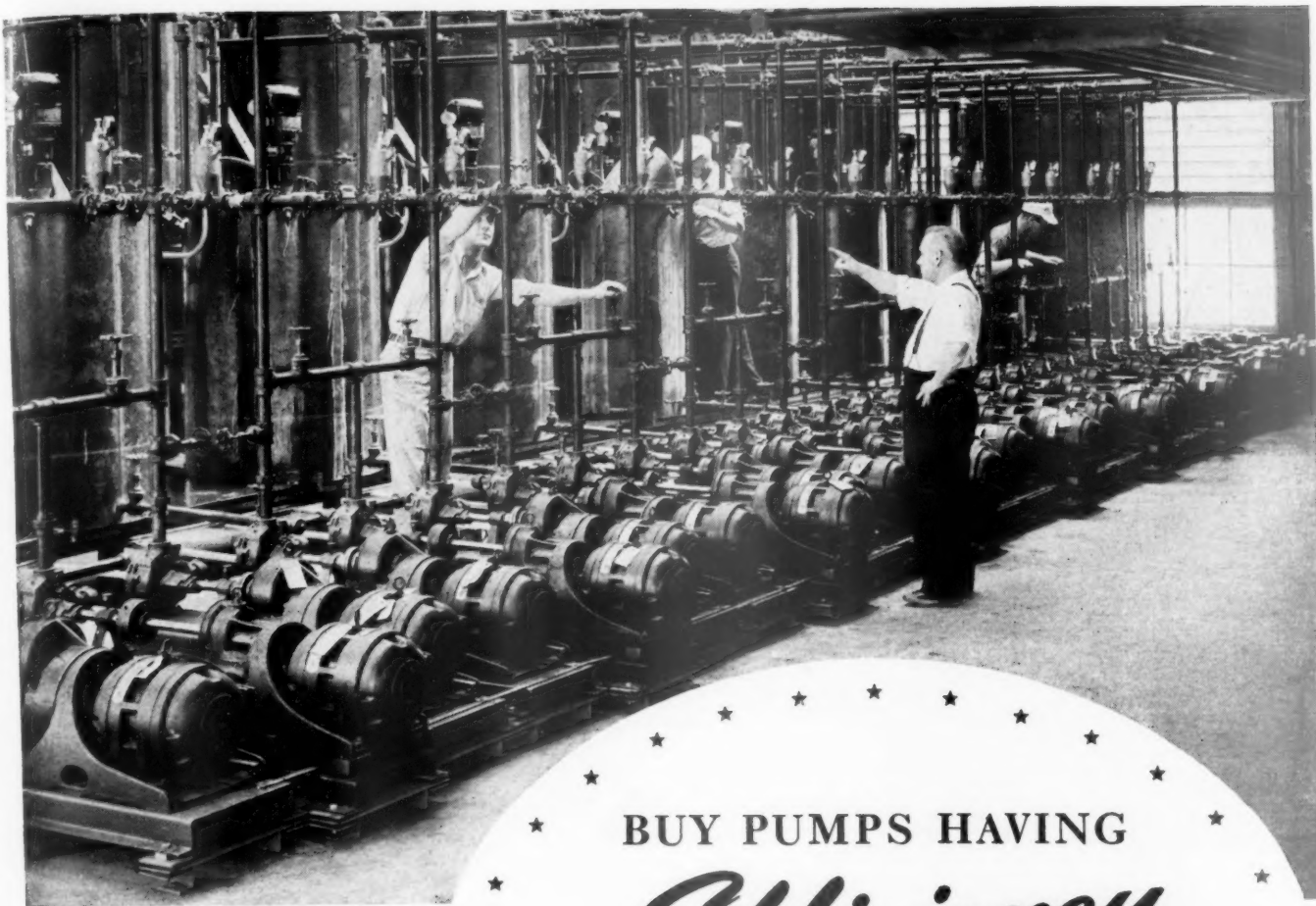
RUBBER

Smoked sheets .....	.22 1/4	.22 1/2	.22 1/2 †
(† Rubber Reserve Co. selling price)			



TEXTILES

Cotton middlings, Galveston.	.1582	.1874	.1883 ↑
Cotton yarns, 22s.....	nom.	.43	.43
Print cloths, 38 1/2", 64 x 60..	nom.	.08971	.08971*
Sheeting, 37", 48 x 48.....	nom.	.10375	.10375*
Wool, fine combing, 1/2-blood	.96	1.15	1.15*
Worsted yarns, French 2-40s	2.00	nom.	nom.
Worsted yarns, English 2-40s	1.95	nom.	nom.
Silk, Japan, double ex. cracks	3.06	3.08	3.08*
Rayon viscose, 150, 40s.....	.53	.55	.55
Burlap, 10 1/2-oz., 40".....	.142	.11	.11*
Hemp, Manila .....	.10 3/4	.10 1/4	.10 1/4



These 36 F-M motor-driven rotary pumps in a large manufacturer's paint mixing room serve distant paint spray booths.

BUY PUMPS HAVING

Efficiency

*That's More Than
Skin Deep!*

THOSE pumps you are about to buy for war production—will they serve you efficiently not only now but also through the years to come?

They will if you choose Fairbanks-Morse Pumps. For these pumps have mechanical superiority which per-

mits them to retain their efficiency long after less highly engineered pumps begin to waste power.

So use your priority to buy pumps for today with an eye for tomorrow. Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago, Illinois.

FAIRBANKS-MORSE

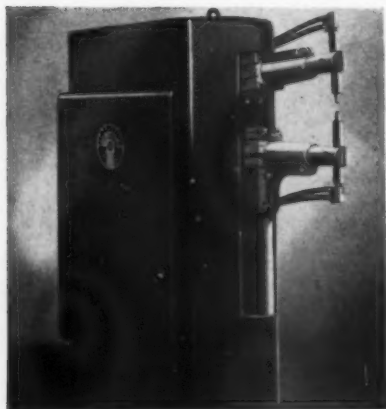


**PUMPS
DIESELS
MOTORS
SCALES**

When writing Fairbanks, Morse & Co. please mention Purchasing

New PRODUCTS • IDEAS

ROCKER ARM WELDER



■ A line of rocker-arm welding machines, available in 48 models has been announced by Progressive Welder Company, Detroit, Mich.

The streamlined rocker arm welders are available in four capacities with three types of drive and a full range of throat depths from 12 to 36 inches. Standard capacities are 20, 30, 40 and 50 K.V.A., and 50/60 cycle supply with other frequencies available at slightly higher cost.

To meet a wide range of requirements these machines are available for foot, air or motor operation. In the lowest-cost foot operated type, the pressure to bring the electrodes together is obtained through pressure on a foot pedal connected to the rocker arm by a system of mechanical links. A limit switch to initiate operation of the contactor at proper pressure, is mounted on the over-travel spring.

A single acting cylinder with piston rod connected to the rocker arm provides the pressure for the air operated types, with a pressure regulator as standard equipment and spring pressure returning the points after completion of weld.

Where air supply is limited, a motor driven type is recommended. The rocker arm welders of this type are provided with a ½ hp. motor, operating the rocker arm through a Reeves variable

speed drive (1 to 3 variation), and worm reduction gear and cam. The control switch is foot-operated.

The lower arms are so designed as to provide a range of vertical adjustment giving a throat opening of from 8 to 16 inches, with electrodes together. Standard point opening for a 12 in. throat depth is 3½ inches. A slight in-and-out lower arm adjustment is also available to insure proper alignment of the electrodes. The lower arm may also be rotated in the holder so that welding can be performed with the electrodes at an angle instead of vertical, when necessary. Standard water-cooled points are provided.

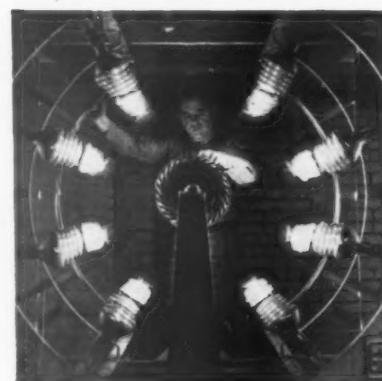
ALL-STEEL FLOODLIGHT



■ A floodlight featuring a unique combination of socket-housing and reflector die-formed in one piece has been announced by the Lighting Division of the General Electric Company. Made entirely of steel, the floodlight utilizes a 200-watt bulb and provides a wide beam which can be pointed in any desired direction by means of the two-jointed shaft upon which the unit rests.

It was designed to provide an inexpensive means of outdoor illumination. It is particularly adapted to such present-day urgencies as dock, platform, and airport lighting, and is useful for any other outdoor areas needing light either for protection against sabotage or for speeding up night work.

INFRA-RED LAMPS



■ Radiant drying lamps, replacing steam heat, have reduced the drying time for 12-inch armatures from 18 hours to 5 hours in a small industrial repair shop. One-hundred-twenty infra-red Westinghouse 250-watt reflector drying lamps (type R-40) are arranged in tubular form in two equal adjustable banks. Three 10 kw. sections, each consisting of eight groups of 5 lamps permits 3 armatures to be baked simultaneously or individually. Heating temperatures range between 240 degrees and 260 degrees F. as compared to 185 degrees to 200 degrees F. with steam heat. Drying time varies from 3 to 9 hours for armatures from 6 to 24 inches in diameter. Power supply is single phase, 3-wire with individual 30 ampere switches controlling the 24 five-lamp groupings, a total load of 30 kw.

The wall construction of the old steam oven remained intact in the revamping. The only changes made were the removal of the steam pipes, the doors and the venting in the roof. Each bank of lamps is supported from the roof on barn door slides, which permits the lamps to be adjusted to the proper distance or 7 inches from the armature surface.

Product of Westinghouse Electric & Manufacturing Co.

(Continued on page 90)

Tube-Turn Welding Fittings are built to *stand the gaff* at the turns!



FASTER INSTALLATION WITH TUBE-TURN WELDING FITTINGS



In the above assembly, Tube-Turn welding fittings are speeding up the erection schedule and permitting a compactness of piping impossible if handled any other way. Also, their uniform wall thickness makes aligning and welding quicker and easier. Note the five Tube-Turn fittings in this small piping section: (1) a 90° elbow; (2) a tee; (3) another 90° elbow; (4) a lap joint welding nipple; (5) a lap joint flange.

It's tough enough to hang on the board when a speed boat is making sharp turns along a zig-zag course, but add the perilous sport of water jousting—and the *danger at the turns* is doubled!

Extra punishment occurs *at the turns* in industrial piping systems, too. That's why it is safer practice to *weld piping with Tube-Turn fittings*. Tube-Turn fittings provide maximum strength, prevent leakage permanently, and practically eliminate maintenance costs.

There's a Tube-Turn fitting for *every* pipe welding need—the right type, size and weight for every job. Insist on genuine Tube-Turn welding fittings for longer life in your piping.

Send for valuable data book and catalog.

TUBE TURNS, INC., LOUISVILLE, KY. Branch offices: New York, Chicago, Philadelphia, Pittsburgh, Cleveland, Tulsa, Houston, Los Angeles, Washington, D. C. Distributors in all principal cities.

TUBE-TURN
TRADE MARK



Welding Fittings





this war can't be won without **RELAYS**

★ You need Relays and Solenoids for timing, fusing and releasing bombs . . . Solenoids to fire the guns . . . Relays to control the radio—floodlights—landing gears—navigation aids—turrets.

Used in practically every type warplane . . . government specified Relays by Guardian are the finest electrical controls we've ever designed . . . more control in less space . . . more room for guns and bombs . . . all done with a "know how" that's unmistakably—Guardian Electric!

★ GUN SWITCH HANDLES

★ TURRET CONTROLS

★ NAVIGATION CONTROLS

★ BOMB RELEASES

★ REMOTE FIRING EQUIPMENT

★ RADIO CONTROLS

★ AIRCRAFT CONTROLS

★ SOLENOID CONTACTORS

P. S. Samples only available now for that "after it's over" product.

GUARDIAN ELECTRIC
1635 WEST WALNUT STREET CHICAGO, ILLINOIS
LARGEST LINE OF RELAYS SERVING AMERICAN WAR INDUSTRY

METAL RECLAIMER

■ An unusual combination picking belt and magnetic pulley separator unit has been designed by Stearns Magnetic Mfg. Co., Milwaukee, Wis., for the purpose of reclaiming brass and secondary metals from assorted junk and metallic refuse of all kinds.

The separator can be designed in sizes to suit the application. The entire machine is equipped with anti-friction bearings throughout.

The drive of this magnetic pulley picking belt combination is by motor reducer and generator installed within the machine and equipped with covers that can be opened to provide access to the drive.

The arrangement of picking belt ahead of the magnetic pulley provides means for sorting the material by hand to eliminate bulky junk of all kinds before reclaiming the brass from the remaining metallic refuse, and provides a very efficient part manual and part automatic operation in one machine.

MATERIALS HANDLING



■ With operating schedules stretching to a 24-hr., seven-day basis and with the available supply of man-power steadily shrinking, one manufacturer of power trucks has gone "all out" in its effort to co-operate with the government and with Industry in the equipment of mills, factories and transport organizations, to move swiftly and safely the rapidly mounting volume of war materials and machines.

Clark Tractor Div. of Clark Equipment Co., Battle Creek, Mich., has for more than twenty years built gas-powered vehicles for handling materials, parts and finished products in factories, at railway terminals and on marine docks. While continuing to supply these gas-powered fork trucks, platform trucks and tractors as before, it is now making its trucks of still greater importance in the war production program by providing them with full electric equipment for storage battery power, where electric operation seems best fitted to the job.

The machines lift from 2,000 to 7,000 lbs., using an hydraulic vane type pump driven by special series wound motor. The same pump operates the tilting unit, which enables the operator to tilt the load back 10 deg. in 5 sec., for safe riding and tilt it forward 3 deg. in 1 sec., for tying. The machines have

When writing Guardian Electric please mention Purchasing

WeldELLS



It's the difference between RIGHT and WRONG —this "selective" reinforcement

BOTH mathematical calculations and practical tests* prove that the bursting stresses in an elbow are greatest at the crotch or inner wall. That's why a special process is employed in producing WeldELLS which provides extra metal in this region of greatest stress as pointed out above. It is the nearest possible approach to the "One Hoss Shay" ideal of absolutely uniform strength throughout.

And it's also one more example of the length to which we have gone in producing WeldELLS to follow sound engineering considerations—considerations which mark the difference between right and nearly right.

An extra value, this—and opposite are listed other extra-value features that are combined in no other fittings for pipe welding. Yet: WeldELLS cost no more!

TAYLOR FORGE & PIPE WORKS, General Offices & Works: Chicago, P. O. Box 485
New York Office: 50 Church Street • Philadelphia Office: Broad Street Station Bldg.

When writing Taylor Forge & Pipe Works please mention Purchasing

WeldELLS have everything—

No other fittings for pipe welding combine the features found in WeldELL. In addition to that described, they include:

- ▶ **Seamless**—greater strength and uniformity.
- ▶ **Tangents**—keep weld away from zone of highest stress—simplify lining up.
- ▶ **Precision quarter-marked end**—simplify layout and help insure accuracy.
- ▶ **Permanent and complete identification marking**—saves time and eliminates errors in shop and field.
- ▶ **Wall thickness never less than specification minimum**—assures full strength and long life.
- ▶ **Machine tool beveled ends**—provides best welding surface and accurate bevel and land.
- ▶ **The most complete line of Welding Fittings and Forged Steel Flanges in the world**—insures complete service and undivided responsibility.

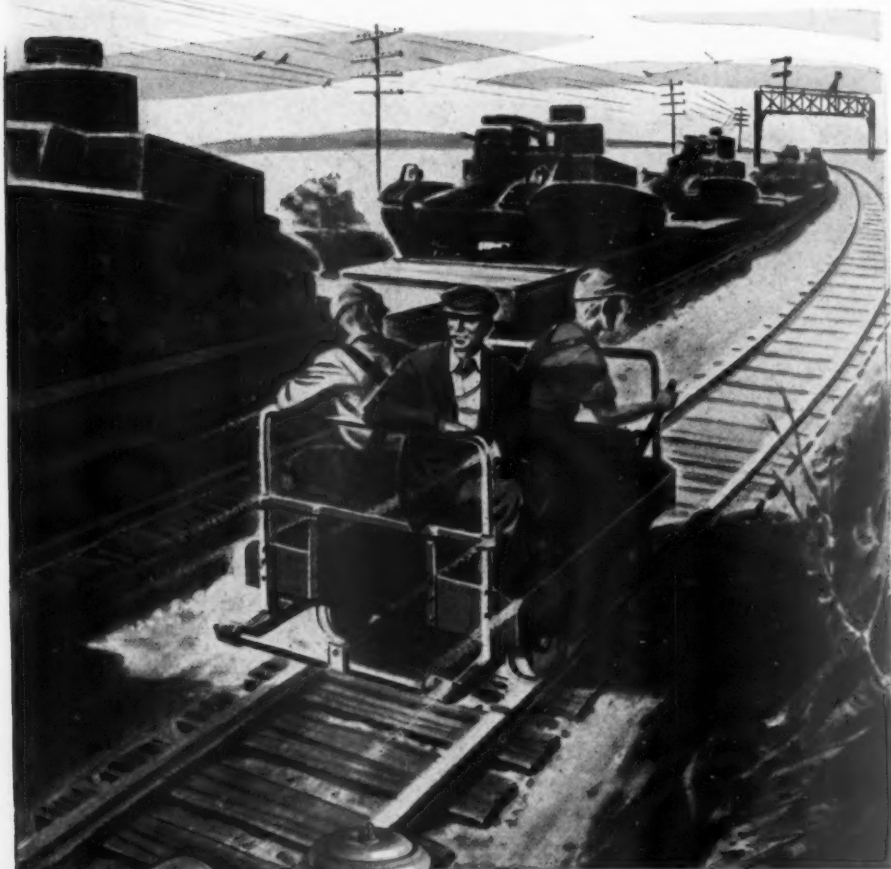
* The amount by which stress is greater at the crotch in a fitting having uniform wall thickness depends only on its radius. Mathematical analysis (specifically the Lorenz formula) shows the stress at the crotch to be:

$$S = \frac{pr(2R-r)}{2t(R-r)}$$

Where S = Bursting stress, lbs. per sq. in.
p = Internal pressure, lbs. per sq. in.
r = 1/2 inside diameter of fitting (O.D. if Barlow's formula is desired).
t = Wall thickness in inches.
R = Center line radius of fitting, inches.
Numerous tests by the Research Division of Taylor Forge show the formula given above to be somewhat on the conservative side.

SMALL MOTORS ON PATROL — *Guarding America's Railways*

Shipments of war material must have the "green light." Roadbeds need inspection and maintenance — bridges, railheads, and war shipments must be protected against saboteurs, wear and tear. So old-fashioned handcars and maintenance equipment give way to modern railroad machinery, much of which is powered by Briggs & Stratton 4-cycle, air-cooled gasoline motors. These sturdy, easy-starting motors can always be depended on to do their part in protecting and maintaining vital rail lines!



Users are urged to check their motors at regular intervals to insure top performance and longer life. If parts or service are needed, go to your dealer or an Authorized Briggs & Stratton Service Station.

Briggs & Stratton motors, from $\frac{2}{3}$ to 6 h.p., are "drafted" for the duration — and are available only to those whose equipment is serving the war program — or for "essential" civilian uses. If your products fall in these classes we will try to serve you.

BRIGGS & STRATTON CORP., Milwaukee, Wis., U.S.A.



four speeds forward and four speeds in reverse, with speeds up to 6 m.p.h. under full load, $7\frac{1}{2}$ m.p.h. empty. The trucks will climb $7\frac{1}{2}$ per cent grades under their maximum loads. Drive is on the front wheels, with rear wheel steer. Drive axle is of special double reduction gear and pinion type mounted on ball and roller bearings. General Electric drive motor is mounted directly to the axle and drives through ring gear and pinion.

Standard equipment includes hydraulic brakes, centrally located control levers, spring mounted, rubber cushioned seats, disc type wheels, electric horn. The motors and electric control equipment are supplied by General Electric. Customer has his choice of Edison alkaline battery or any standard make of acid battery.

WIPING AND POLISHING MATERIAL



Kimberly-Clark Corporation, Neenah, Wisconsin, are introducing a non-abrasive, one-time-use, disposable wiping sheet, made of Kimpak creped wadding, a close texture sheet of cellulose fiber, creped to provide rubbing strength. It is also soft and absorbent, and readily picks up dust, oil and grease.

Made in two convenient sizes, 5" x 9", and 15" x 18", they are serviced one sheet at a time from dispensers.

Typical uses are: For wiping and polishing surfaces of plastics, metal, wood, glass, etc., industrial goggles, machinery, parts for machines, engines, and instruments.

For polishing duty, they may be used with most waxes, oils, and solvents without disintegrating, and without linting, because the material is practically free from any sifting fibers.

AUTOMATIC ELECTRICAL TIMER

A simple, foolproof electrical timing device which should find many applications in industrial plants has been announced by Philco Corporation, Philadelphia, Pa. This automatic time switch is arranged to close an electrical circuit after the expiration of a pre-determined time, although it can be adapted for opening a circuit by simply reversing the position of the mercury switch element. When used on a.c. circuits, it has a capacity of 1200 watts, sufficient to control a 1 hp. motor of the repulsion induction type.

The setting operation merely requires the turning of a knob to the time (AM

When writing Briggs & Stratton Corp. please mention Purchasing



SCRAP WILL WIN

THROW YOUR
SCRAP INTO
THE FIGHT
!

IN every shop, every store, every home, there's a lot of junk, It is useless where it is, but mobilized, it can help win the war.

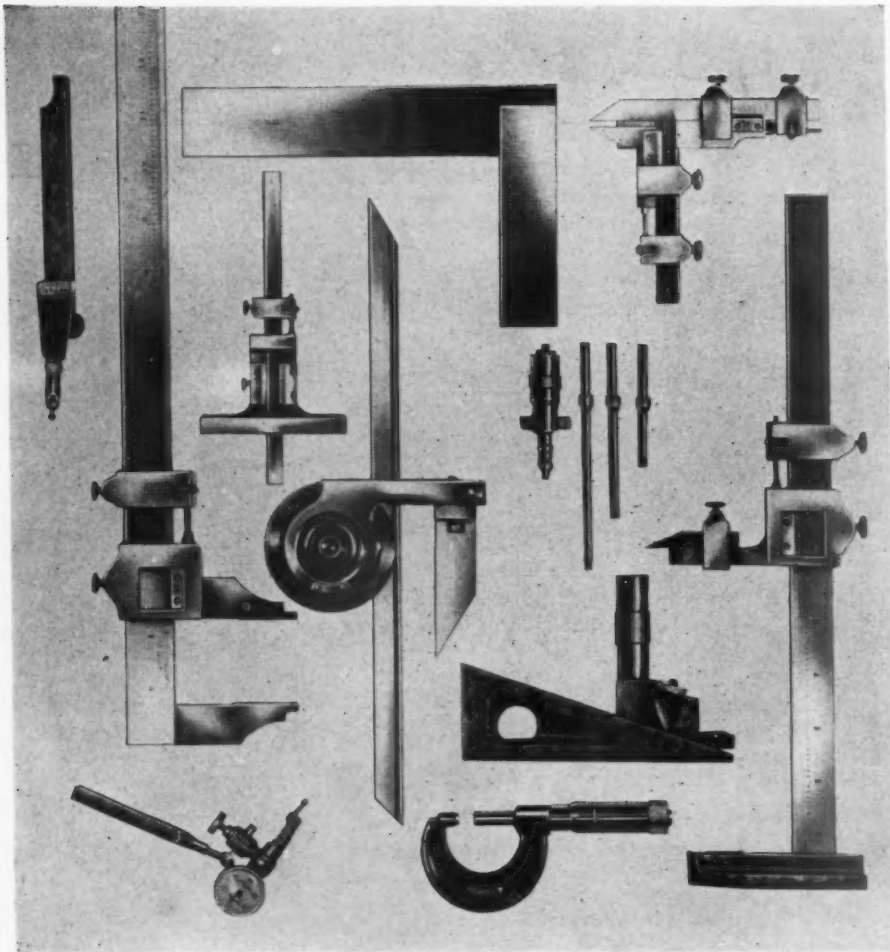
Old iron and steel, brass and copper, rubber, even burlap, paper and grease, are badly needed in huge quantities by American war industries.

It is the immediate duty of every individual to do his part in the drive to mobilize scrap. Keep it flowing through regular scrap collection channels so it can be processed into war material.

This is the way that your cooperation with the all-out effort of the steel industry can insure earliest possible Victory. **THROW YOUR SCRAP INTO THE FIGHT.**

THE YOUNGSTOWN SHEET AND TUBE CO.
Youngstown, Ohio

When writing The Youngstown Sheet and Tube Co. please mention Purchasing



STARRETT TOOLS are undertaking an important share of the responsibility for the superiority of American war machines. On countless precision measuring and inspecting operations they contribute to speed of production and conservation of materials as well as accuracy. They enjoy the confidence of the men who work with them.

While exerting every effort to meet the extreme demand for precision tools, The L. S. Starrett Company intends to maintain the standards for accuracy and workmanship that users of Starrett Tools have learned to count on for the past 60 years.

THE L. S. STARRETT CO. ATHOL, MASSACHUSETTS, U. S. A.

World's Greatest Toolmakers

STARRETT

**PRECISION TOOLS • DIAL INDICATORS • GROUND FLAT STOCK
HACKSAWS • METAL CUTTING BANDSAWS • STEEL TAPES**

When writing The L. S. Starrett Co. please mention Purchasing

or PM—up to 23 hours in advance) that the switch is to operate. A series connector with five feet of heavy-duty cord is supplied to simplify connections to plug-in types of electrical equipment. The connector plugs into the electrical outlet and the apparatus to be controlled plugs into the connector. The installation is completed by fastening the timer to the wall directly above the electrical outlet, at a convenient height.

Electrical circuits controlled by wall switches can be adapted for "timed" operation by removing the wall switch and installing the automatic electrical timer over the switch box.

PORTABLE FLOODLIGHT



■ A portable battery-operated floodlight has been announced by the Illuminating Laboratory of the General Electric Company of Schenectady, N. Y., especially for combustible areas which cannot have installed lighting. This unit is intended for use in such places as powder igloo interiors, powder magazines, freight car and warehouse interiors containing combustibles, and during black-outs and other emergencies.

The floodlight consists of a small steel box (19" x 9 7/8" x 20 3/4"), with a special dust- and vapor-proof lamp housing mounted on a bracket to allow pointing in any desired direction. A high-efficiency glass reflector, combined with pre-focus positioning of the unit's 50-candlepower concentrated-filament type bulb and a diffusive lens, gives a powerful medium-angle floodlighting distribution.

A 5-cell storage battery with nonspill valves is housed in the box. Quick exchange of discharged for charged batteries is made possible through a polarized connector permanently wired to the battery terminals. Normal burning time for the unit is approximately 10 hours.

ARC WELDER

■ To meet the war need for continuous high duty mass production welding, the Ergolyte Manufacturing Company, Philadelphia, Pa., has announced the development of a heavy duty air-cooled arc welder, known as the 250 F. The machine contains a built-in cooling system, and is heavier all around than its sister model the non air-cooled Ergolyte 250.

Shows You WHERE and HOW to Improve Lighting to Meet War Production Demands

LOOK... PAGE 6 SHOWS
HOW MUCH LIGHT WE NEED
FOR THAT NEW
DEPARTMENT!



It's Important to Get the Answers
to Questions Like These:

- Why Does Good Lighting Conserve Nervous and Physical Energy?
- What Effect has Lighting on the Accident Rate?
- What are the Five Factors Involved in the Seeing Task which Determine the Amount of Lighting Required?
- How may Maximum Efficiency be Secured from the Present Lighting System?
- What factors must be Considered in Selecting the Most Effective Lighting Units?

You'll find the answers to all these and many other important questions, as well as the solutions to 21 everyday lighting problems in your complimentary copy of the new booklet, "Benjamin Specifications for Productive Lighting".

Free to Plant Executives, Specifying Engineers and all others concerned with Productive Lighting

Lighting is high on the list of recommended things to check and improve to increase production. Why? Two reasons: First, because good lighting is basic to good seeing and without good seeing there can be no efficient production. Second, because lighting improvement in many plants has all too often not kept pace with plant improvement in machines and methods.

Lighting Can Help You Meet War Production Demands

Night shifts, overtime, six and seven day weeks and high speed sustained production have put a tremendous tax on the eyes, health and reserve energy of employees. War production, therefore, demands lighting which will make seeing quicker, easier and less tiring... lighting that will prevent eye fatigue, insure keener eyes and a quicker hand, and provide a cheerful environment for both day and night workers. In this and a myriad of other war production problems such as maximum utilization of floor areas, lighting of hazardous locations, the problem of the visually deficient older employees, etc.,

improved lighting is an important factor.

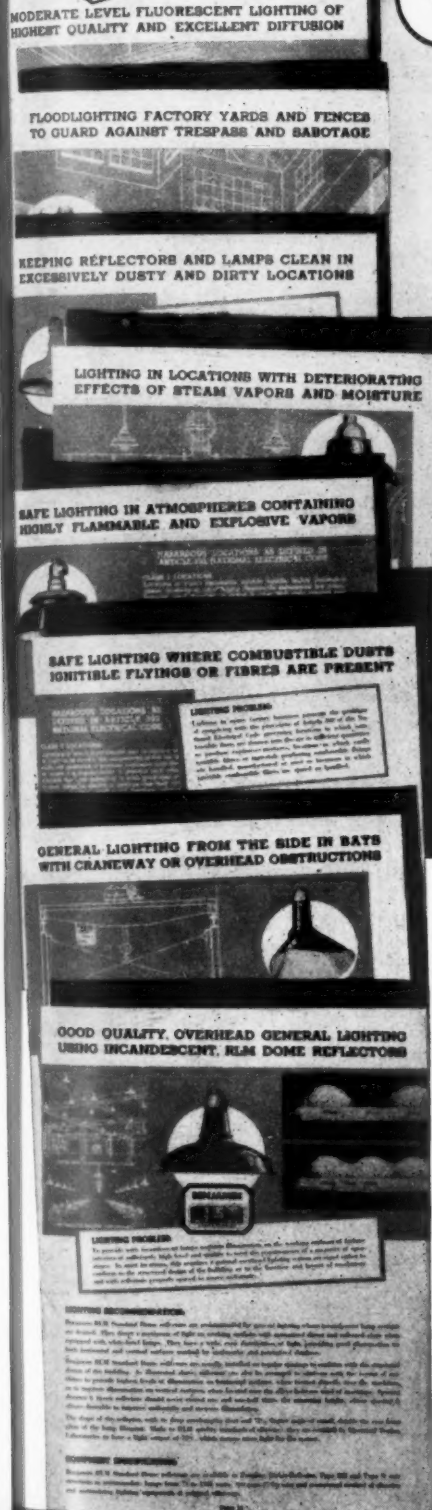
You Need this New 36-Page Book to Assist You in this Important Job

For the vitally important job of checking lighting and planning lighting you will find invaluable, the data contained in the new "Benjamin Specifications for Productive Lighting in War Plants". Here in this new book is working information, up-to-minute, authoritative, which you can put to immediate use. In this manual are 21 lighting problems and their solutions, selected from those most frequently submitted to the Benjamin Engineering Department. The answers to these problems are complete, so that you can specify the proper lighting equipment without further delay. This new 36-page manual takes you step by step through the entire procedure of checking, analyzing and specifying lighting equipment. You will want a copy for yourself and your associates. A request on your letterhead or on the coupon will bring you a copy by return mail without cost or obligation. Address Benjamin Electric Mfg. Co., Dept. Y, Des Plaines, Illinois.

BENJAMIN ELECTRIC MFG. CO., Dept. Y, Des Plaines, Illinois

Please send, without cost or obligation to me, a complimentary copy of your new "Benjamin Specifications for Productive Lighting in War Plants".

Name.....
Company.....
Address.....
City..... State.....



BENJAMIN
TRADE MARK
WORLD LEADER IN INDUSTRIAL
LIGHTING EQUIPMENT



On Your Sub-Contracts for Fabricated Metal Parts

● Like Uncle Sam's highly efficient Engineers, the Lyon War Products Committee works as a well balanced team to give your fabricated metal parts problems fast and effective action. This committee—representing all major departments—brings more than a year's specialized experience to determining how Lyon can serve you, and how fast your needs can be met.

Supporting this War Products Committee is a nation-wide crew of field men specially trained to gather all pertinent facts, modern plants equipped to handle volume production, and design engineers, plant executives and workmen long skilled in producing quality sheet metal products of all kinds. Modern machinery and completely equipped toolrooms enable us to handle all operations—including making and maintaining of dies and jigs—in our own plants.

So, if you have war products or parts that require fabrication of No. 8 to No. 30 gauge metal, turn to Lyon for action. Write for brochure, "Craftsmen in War Production," describing Lyon facilities in detail.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 3308 Madison Avenue, Aurora, Illinois

Sales and District Offices Manned by Experienced Engineers in All Principal Cities

THIS BROCHURE will help enable any producer of War Materials to determine where Lyon facilities and experience help him accelerate production. A copy is yours for the asking.

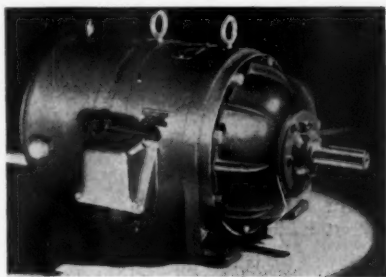


LYON METAL PRODUCTS, INCORPORATED

When writing Lyon Metal Products, Incorporated please mention Purchasing

The war-time demand for virtually continuous welding prompted the development of this machine. Its makers point out that under normal conditions, naturally cooled welders get a chance to cool down, while their operators change rods, remove slag and position work. Today, however, the active duty cycle is at a peak. The welder merely changes rods, his assistants perform the other operations. Consequently, the welding machine is in almost constant use at a high duty cycle and unless it is provided with cooling equipment the above normal temperatures will cause it to lag and eventually burn out. On the contrary, the low temperature of an air-cooled machine reduces the thermal stress which strains the insulation on ordinary machines and shortens their lives. Capable of handling an electrode from 1/16" to 3/16", this model has 24 heat steps, an input voltage of 230 volts and a current range from 15 to 250 amperes. The 250 F has a 60 cycle frequency and operates on a single phase or one phase of a two or three phase current. Special frequencies may be built to order.

INDUCTION MOTORS



■ A line of polyphase induction motors in sizes from 1 to 20 horsepower, NEMA frames 203 to 326 inclusive, suitable for use under magnesium dust conditions has been announced by the General Electric Company. Labeled as suitable for Class II, Group E locations, this line should find extensive use in the rapidly growing number of plants handling magnesium, particularly where fine magnesium dust is encountered.

It has been developed to meet a need brought about by the extensive use of magnesium and aluminum in war production. In many cases, motors are being subjected to these metals in the form of fine powder, as used in incendiary bombs and for other military purposes, or from castings during grinding or polishing operations. Since these dusts are extremely combustible, they present a hazard classified by the National Electrical Code as Class II, Group E, requiring special motors and control.

They are totally enclosed, with a non-ventilated construction in the smaller ratings and a fan-cooled construction above 2 hp. Simple cast-iron end shields, stator frames, and fan housings make possible dust-tightness without complicating assembly or disassembly.

4

IMPORTANT TIPS on Speedier Piping Installation!

No matter what type of piping system your plant-extension program may call for . . . Grinnell's complete range of piping services and products offers short-cuts to a better

installation! Here are four time-savers for you . . . four of many Grinnell products that are clipping months or minutes off today's war construction schedules involving piping.



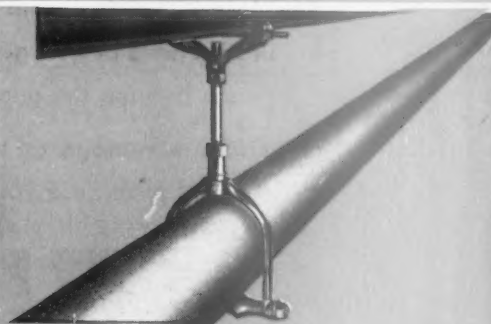
1 PREFABRICATED PIPING by Grinnell saves fabricating and erecting time . . . supplies speedily-erected, pre-tested sub-assemblies for complete power or process piping systems.



2 SPRING CONSTANT-SUPPORT HANGERS for high temperature piping are pre-fitted to exact engineered layouts . . . provide floating suspension, speedily installed, for loads from 250 to 3,500 lbs.



3 GRINNELL WELDING FITTINGS are identically metal-matched with your pipe or tubing . . . tailor-made to cut minutes-per-weld in pipe erection.



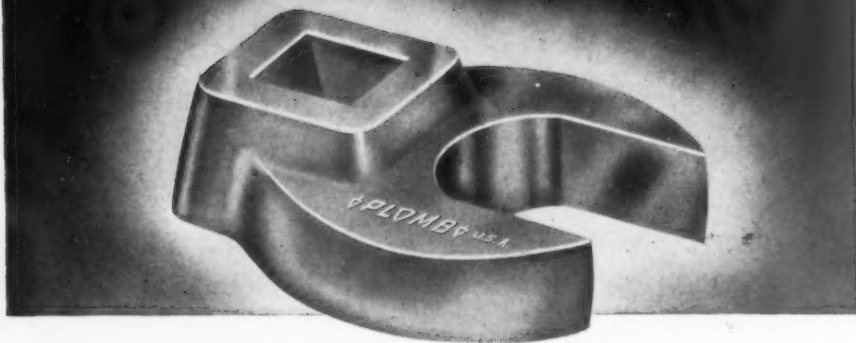
4 ADJUSTABLE PIPE HANGERS by Grinnell are engineered to provide the right hanger for ANY piping ANYWHERE. Faster to install . . . more compact.

WRITE FOR Data Folders on these Grinnell time-savers. Grinnell Company, Inc., Executive Offices, Providence, Rhode Island. Branch offices in principal cities.

GRINNELL

WHENEVER PIPING IS INVOLVED

Answer to one problem —



CONSULT US *about Your Problem*

If special hand tools can speed your production, Plomb is ready to serve you. Plomb engineers have helped many manufacturers find the answers to "hard-to-get-at" problems. Consult us...now or in the future...for this service.

See your PLOMB dealer for regular needs

Plomb Tools for all regular work are handled by dependable Plomb dealers everywhere. See the Plomb dealer in your locality for your tool requirements.

Sub-contracting makes this service possible

In addition to Plomb's own three factories, 27 other factories have been organized into a complete system to build tools bearing the name of Plomb.

Take advantage of this two-fold service. Consult us for special tools...see your local Plomb dealer for stock tools.

▽ PLOMB ▽

Streamlined Tools



PLOMB TOOLS CONTRACTING CO. • A Division of the

PLOMB TOOL COMPANY

L O S A N G E L E S

When Writing Plomb Tool Company, please mention Purchasing

Other features include nonsparking bronze external fans, relatively straight and smooth external ventilating passages (for fan-cooled motors) to facilitate cleaning, permanently sealed-in leads, and a rotating labyrinth seal at the shaft opening.

BENCH MARKING MACHINE



■ A hand operated marking machine that will do 650 or more shell noses per hour is offered by The Acromark Corporation, Elizabeth, New Jersey, for manufacturers of war materials. A girl can operate it because the gearing is such that a simple swing of the hand lever rotates the part and rolls the mark in accurately to a pre-determined depth.

The cast iron hollow base encloses a reduction gearing to the hand lever and a gear and rack arrangement to rotate the part to be marked in perfect unison with the straight line interchangeable type holder.

The type holder is placed at an angle on the accurate slide with adjustable gibs and in operation a smooth slide movement rolls the straight line characters into the tapered part.

One or two lines can be marked without distortion of the mark and without undue effort on the part of the operator. Mandrels can be interchangeable for different sizes of parts and a double screw arrangement at the back of the type holder slides it forward or backward for marking depth.

This machine has been used successfully for marking steel, aluminum, zinc and brass parts. The fact that most economical-to-purchase straight line type is used must not be overlooked as it is an economy feature and also we call your attention to the production speed with unskilled labor in this inexpensive machine that saves your larger equipment for other productive jobs and requires no electric power for operation.

MAGNETIC SEPARATOR

■ Radical redesigning of its Type "R" Wetherill cross belt magnetic separator has been announced by the Stearns Magnetic Mfg. Co., Milwaukee, Wisconsin.

The separator now has a distinctively modern appearance insofar as structural frame design is concerned. Elimination of much of the heavy frame work which formerly supported the coils has been accomplished without in any way weakening the structural advantages of the unit.

It employs the cross belt method of magnetic separation, the material being fed by a special feeding device onto the

insulation baking time



CUT IN HALF

with Westinghouse
Insulating Varnish

THERMOSET No. 7826

Tougher insulation—faster. That's the performance of the new Westinghouse Insulating Varnish—THERMOSET No. 7826.

If you now use ordinary linseed or chinawood oil varnishes, THERMOSET No. 7826 can double the output of your baking ovens. And by using infra-red baking methods, speeds can be increased still further.

Because Thermoset cures by heat-induced chemical polymerization—not by oxidation or drying—interiors are fully cured, dielectrically uniform. And because Thermoset hardens to a completely infusible state, it will not soften in equipment operated at high temperatures, or throw out at high speeds. It is the practical varnish for all wound apparatus.

Complete application data—developed by Westinghouse in the manufacture of the world's largest generators and motors—gladly will be furnished to any user of Thermoset. Consult the Westinghouse Insulation Specialist assigned to your district or write at once to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-06329



Easily Applied—by dip, brush, pressure or spray.

Penetrates Deepest Windings—leaves no air pockets.

Uniform Dielectric Strength—prevents separation or vibration-caused shorts.

Resists Chemical Attack—inert to moisture, oil, acids, and alkalis.

High Mechanical Strength—bends without cracking!

Noncorrosive—won't attack wires!

Westinghouse



INSULATING MATERIALS

When writing Westinghouse Electric & Manufacturing Company please mention Purchasing



MULTIPLY WITH DODGE TRANSMISSION EQUIPMENT

YOU can protect thinning margins of power reserves by installing Dodge Power Transmission equipment. It increases available power by eliminating power loss and waste — puts all the power in the job. You can multiply the production of motors by applying Dodge equipment in modern group drives where practicable — releasing motors for additional applications.

Industry is faced with the necessity of increasing production with existing power resources. The only immediate solution is better utilization — more efficient power transmission — better application of equipment.

The Dodge Distributor is prepared to serve you with a complete line of power transmission equipment that includes alternate selections — providing for more prompt delivery. The completeness of the line saves "shopping" — places responsibility.

Dodge is putting all its power in the job. Engineering ability — manufacturing facilities — 61 years of experience in furnishing industry with "The Right Drive For Every Job". . . are dedicated to Victory production through resourceful, alert distributors putting all their power into serving industry.

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana, U. S. A.



When writing Dodge Manufacturing Corporation please mention Purchasing

main belt and the magnetic portions being intercepted and carried to special chutes on the side. In the general application of separators of this class either a single magnet unit or one having a sufficient number of magnets to effect the desired separation can be furnished.

Materials varying in magnetic permeability or the separation of magnetic material can be treated very readily on Type "R" separators. In many problems a clean cut, sharp separation can be made, while in others, sufficient improvement can be effected to purify and lift the penalties imposed, creating a ready market for the product. The number of products produced depends on the number of magnets employed, each magnet producing two magnetic products.

They are constructed in many and varied combinations, having one or more magnets, the windings of which are made very powerful, being separately controlled by rheostat. Ammeters in circuit with the windings provide for accurate readings, and make possible the regulation of each magnet by the resistance method to a definite power or magnetic force, thereby effecting a clean separation and also a duplication when changing from one material to another. Any combination can be supplied or special windings furnished when required.

ANTI-FREEZE



■ A permanent type anti-freeze which contains no critical materials and is therefore available in unlimited quantity, is manufactured by Great Northern Chemical Co., Oak Park, Ill.

It is guaranteed against freezing down to 35° below zero; prevents rust of any part of the cooling system (not simply rust-resistant); is harmless to engine, car finish or person; will not boil off or evaporate (boiling point 324°) and never requires testing for anti-freeze strength. It contains no acid, calcium chloride, sodium chloride or other inorganic salts.

The manufacturer's guarantee is said to be covered by an insurance policy issued by the world's largest insurance organization. Freedom afforded by "this product" from the usual worry concerning the anti-freeze strength of

PRODUCE STILL MORE
get 20% greater tool
efficiency with

MO-MAX

TRADE MARK REG. U.S. PAT. OFF.

MOLYBDENUM-TUNGSTEN HIGH SPEED STEEL

Milling cartridge clearance slot in machine gun. On jobs such as this, MO-MAX is the logical choice.



- ➔ MO-MAX makes possible maximum conservation of vital alloys.
- 1 It contains less than two percent of tungsten. This amount is being produced in this country or is available from existing high speed steel scrap.
 - 2 It contains only one percent of vanadium—a critical alloy.
 - 3 Molybdenum is produced in large quantities within our borders.
 - 4 A chromium content of 3.50 to 4.00% is satisfactory—thus a minimum of chromium is required.
 - 5 MO-MAX has a nine-year record of proved performance, and can be obtained from fourteen leading steel manufacturers.

For Technical Data Booklet!

Write any of the steel makers listed or to The Cleveland Twist Drill Co., Cleveland, Ohio.



LMW ... Alleghany Ludlum Steel Company
MOHICAN ... Atlas Steels, Ltd.
BETHLEHEM HM ... Bethlehem Steel Company
MO-CUT ... Braeburn Alloy Steel Corporation
STAR MAX ... Carpenter Steel Company
MOLITE 8 ... Columbia Tool Steel Company
REX TMO ... Crucible Steel Company of America
DI-MOL ... Henry Disston & Sons, Inc.
REX TMO ... Halcomb Steel Division
Crucible Steel Company of America
MOGUL ... Jessop Steel Company
TATMO ... Latrobe Electric Steel Company
S.T.M. ... Simonds Saw and Steel Company
MO-TUNG ... Universal-Cyclops Steel Corporation
VUL-MO ... Vulcan Crucible Steel Company

Ⓢ 2426

When writing The Cleveland Twist Drill Co. please mention Purchasing

FOR YOUR DUST AND FUME HAZARDS . . .

RESPIRATORS BY M.S.A.

FIRST in safety and comfort

These respirators provide the utmost in value for each specific application. They are manufactured exclusively by the world's largest commercial producer of approved safety equipment—headquarters for all industry for every safety requirement. Demonstrations on request.



M.S.A. *Comfo* RESPIRATOR WITH PLASTIC FILTER CONTAINERS

This husky veteran in complete dust protection has proved its ability to take hard service over years of top popularity. Now designed with all-plastic filter containers, the Comfo, U. S. Bureau of Mines Approved, offers even lower breathing resistance—better sidewise and downward vision—high impact strength—non-conductor of electricity. Flexible, easy-fitting facepiece, twin replaceable filters, other superior features are detailed in Bulletin CR-9.



M.S.A. *Dustfoe* RESPIRATOR

Best-selling wherever compact size, light weight and safety are demanded, the Dustfoe, U. S. Bureau of Mines Approved, is easy to wear and simple to maintain. Deep facepiece is contoured for snug fit, with soft facecushion for maximum comfort; foolproof exhalation valve, protective filter cover, strong and simple construction throughout provide troublefree service on the job. Write for Bulletin CM-5.

M.S.A. CHEMICAL CARTRIDGE RESPIRATOR

For paint spraying and other industrial processes where harmful or irritating gases and vapors are encountered in light concentrations. Comfo-type facepiece is equipped with twin chemical cartridges, providing three times the service life of single cartridge types. The cartridges are quickly replaceable—the respirator body, like all M.S.A. respirators, is easy to clean and may be sterilized without harm. Bulletin EM-3.



M.S.A. *Comfo* METAL FUME RESPIRATOR

Thoroughly protects the wearer from toxic fumes of burning or molten metals such as lead, cadmium, zinc, manganese, chromium, arsenic, etc., as encountered in burning, pouring or molding operations. Of basic Comfo design, the respirator, U. S. Bureau of Mines Approved, employs specially-processed replaceable filters with low resistance to breathing. Bulletin CR-6. (See Bulletin CR-8 for special Welder's Model).

M.S.A. AIR LINE RESPIRATOR

Wherever the worker is exposed to a variety or mixture of dusts, gases and fumes, this respirator renders him completely independent of the working atmosphere. Compressed air is supplied to Navy-type half-mask facepiece through flexible corrugated tube from control valve at belt—double exhalation-valves increase breathing comfort. U. S. Bureau of Mines Approved. Bulletin CS-9.



MINE SAFETY APPLIANCES CO.

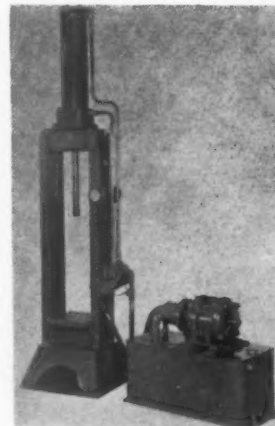
Braddock, Thomas and Meade Streets, Pittsburgh, Pa.

District Representatives in Principal Cities

the solution is pointed out as being of particular interest to car owners in these times of limited publication of weather reports. Commercial operators are said to have reported savings of as much as \$200 per season in labor costs because of elimination of the usual twice-daily testing of solution in radiators.

The product is delivered in one-gallon glass pails which may be saved for its storage for re-use another season.

HYDRAULIC PRESS



■ A fully hydraulic press designed for a specific purpose in war industry but with a broad industrial application is announced by Hydraulic Machinery, Inc., Detroit, Michigan.

The specifications are as follows: 25 ton pressure; 30" stroke; 60" daylight; 4.4" per second (closing speed); .8" per second (high pressure speed); 5" per second (opening speed); 25" from floor to platen; 18" x 18" platen; combination pump, relief, check and unloading valve; 7½ hp., 1200 rpm, 3ph, 60 cycle motor; manually operated control valve (controlling the direction of the ram); 0-3000# p.s.i. pressure gauge at head height; 2½"-8 thread on ram, 3¾" long. This press is of welded steel construction, mounted on a flared base 30" x 30" and the height overall is 139". The power unit, shown adjacent to the press, may also be installed in another room, building or other convenient place.

BALANCING MACHINE

■ Stimulated by industry's wartime production requirements for positive balancing equipment having extraordinary capacities, Gisholt Machine Company, of Madison, Wis., development engineers, have broadened the over-all range of the dynetric balancing machine line to extremes of 1 ounce and 50 tons, according to a recent announcement.

This expansion of effective static and dynamic balancing capacity, proving the flexibility of the fundamental dynetric principle, has been brought about by two major developments: (1) The new floor type machine, built to balance parts up

When writing Mine Safety Appliances Co. please mention Purchasing



IMMORTAL STEEL!

Steel never dies!

That chugging old "runabout" you prized in 1913 may have been the great-granddaddy of this reaping, roaring, death-spitting Army Jeep! For some of the scrap steel from that old favorite may actually have found its way into the blitz buggies of our mobile Army.

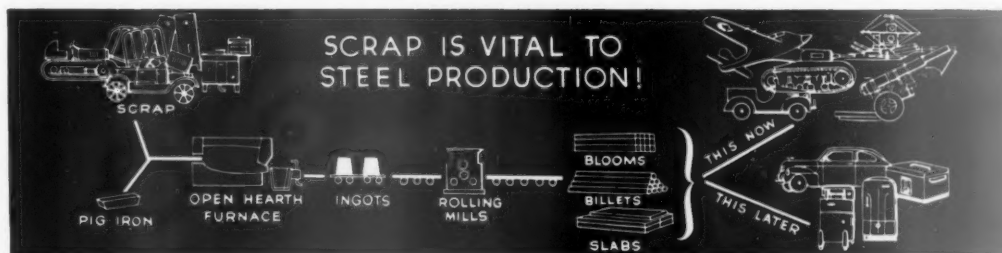
Thus is the immortality of steel demonstrated.

For steel not only perpetuates itself but also is improved in the process, by combining in proper degree old, worn out, discarded products of steel with smelted iron ore to produce more and better steel for the formidable weapons of the nation's defenders. Each ton of iron and steel scrap so "mixed" results in approximately TWO tons of vital new steel... for war now...

for as yet undreamed of uses and conveniences later.

So Steel lives on! With each re-use it multiplies itself... is made into more and better products... serves another steel lifetime of usefulness... returns to scrap, to repeat a cycle of ever growing volume and indestructibility.

Scrap, desperately needed now to produce more steel for war, will one day make your life and your America more happy and abundant. For now... for then... *get in the scrap!*



Pittsburgh Steel Co.

GRANT BUILDING PITTSBURGH, PA.



...coming through the Steel!

The chief metallurgist of the company operating the Campbell machine shown above reported that it is cutting heat-resistant alloy steels, Hadfield's manganese steel, abrasion-resistant irons, and alloy white cast iron with BHN of approximately 700.

On some jobs Campbell Abrasive Cutting Machines condense four operations into one: sawing, milling, grinding, and finishing to a mirror surface.

The Campbell easily handles a variety of stocks including glass, porcelain, plastics, brick and stone.

Campbell machines are today working on many a war production job; on parts for aircraft, aircraft engines, propellers, army trucks, cars and tanks, machine guns, bombs and shells, small arms ammunition, projectiles, field telephones.

Campbell Cutting Machines are one of 137 products we build for Industry, Agriculture, and Transportation, which are essential in peace, vital in war.



AMERICAN CHAIN & CABLE

COMPANY, INC. • BRIDGEPORT, CONNECTICUT

In Canada—Dominion Chain Company, Ltd. • In England—The Parsons Chain Company, Ltd., and British Wire Products, Ltd.
American Chain, American Cable Wire Rope and Aircraft Controls, Campbell Cutting Machines, Ford Chain Blocks, Hazard Wire Rope, Manley Garage Equipment, Owen Springs, Page Fence and Welding Wire, Reading Castings, Reading-Pratt & Cady Valves, Wright Hoists and Cranes

When writing American Chain & Cable Company, Inc. please mention Purchasing

to 100,000 pounds in weight, 240 inches in length, with 200 inch swing, has successfully passed all tests and is now in use; (2) The Type S, first to be manufactured and smallest of the entire line, was been perfected to balance parts weighing as little as one ounce.

FIBRE CONTAINER REPLACES METAL



■ After many months of experimentation, the American Can Company has developed a revolutionary method for the making of cans with fibre bodies on machines used for the manufacture of metal containers. This method will make available to the entire industry, as soon as it has been thoroughly tried and perfected through actual production, is considered the most important development within the can manufacturing industry within the past decade.

The greatest merit, perhaps, is that no new machinery is required. At a time when it is impossible to get new machinery or tools and materials with which to construct it, they have devised this method of feeding fibre sheets into existing machines geared for manufacturing metal cans and obtaining a reasonable facsimile of the old container. Another factor of merit of this development is that the manufacturer of a product which uses the cans, also may use his existing packaging machinery. This is highly important, as the product-manufacturer is faced with the same conditions as confront the can manufacturer in the matter of priorities. He would be unable to procure the new machinery necessitated by new packing methods which would be forced on him by substitute containers.

Under the method, paper will be run through the various tin can lines. The fibre, cut to sheets of tin plate size, lithographed on the regular presses formerly used for lithographing designs on tin plate, will then be sheared and formed into bodies. The ends will be seamed on to the container with the regular seaming machine now in use.

WOOD SASH

■ An important projected wood sash development that appears to have broad sales possibilities in the present priority emergency, particularly for industrial installations, has been announced by National Door Manufacturers Association of Chicago, Ill. This sash has been engineered by the internationally known architectural firm of Graham, Anderson,



Make this label
your key to new
or conversion
lighting



For large plants or small

wherever fluorescent lighting
is needed to speed the job . . .
specify FLEUR-O-LIERS



Precision and speed are uppermost in this airplane engine plant. These sturdy 100-watt FLEUR-O-LIER units are helping to keep production in high gear.



FLEUR-O-LIERS provide even, shadow-free light in this fabrics shop helping to prevent cutting mistakes which would mean accidents and waste.



Get this new booklet for full details and list of manufacturers. Write FLEUR-O-LIER MANUFACTURERS, 2139-8 Keith Building, Cleveland, Ohio.

FLEUR-O-LIERS

CERTIFIED FIXTURES FOR FLUORESCENT LIGHTING

Participation in the FLEUR-O-LIER MANUFACTURERS' program is open to any manufacturer who complies with FLEUR-O-LIER requirements

When writing Fleur-O-Lier Manufacturers please mention Purchasing

With War needs forcing plants to cram three days' work into one, the value of dependable fluorescent lighting is making itself more evident than ever. Whether it's in an office, drafting room or out in the shop, you can specify FLEUR-O-LIERS, and be sure of getting fixtures built for dependable service and maximum lighting performance. The FLEUR-O-LIER label is your key.

FLEUR-O-LIERS are made in various sizes and designs by over 45 leading fixture manufacturers located at important points all over the country. This means better service on war plant orders, for either new or conversion lighting.

FLEUR-O-LIERS are *tested* and *certified* by impartial Electrical Testing Laboratories of New York as meeting 50 definite Standards set up by MAZDA lamp manufacturers for balanced performance and satisfactory operation.


A **vital tool** in wartime production, fluorescent fixtures now require a suitable WPB priority rating. Any of the FLEUR-O-LIER Manufacturers, your electrical contractor, wholesaler or electric service company will be glad to work with you on this to get the best lighting possible.



HERC-ALLOY
STEEL CHAIN
with
patented "INSWELL" welds

**Short, stubby links
bridge the corners
...without gouging
and bending stress**

★ Herc-Alloy Steel Chain with the exclusive patented "Inswell" welds is proving its superiority in every type of application. Fabricated from a special analysis, heat treated steel, the sturdy short, stubby links bridge square corners (see photograph above) minimizing bending stress and gouging...adding extra chain life and economy even under the most punishing assignments.

 **25% extra margin of safety and wear**

Note the extra "swell" of steel at the weld of Herc-Alloy steel chain. With 25% extra metal at the point where strength is vital, these "Inswell" welded links give extra safety to men and materials...and longer chain life. Specify and insist on Herc-Alloy—it's your assurance of extra dependability, economy and safety.

Whether or not you need chain today...get the facts. Complete catalog on request and trained CM engineers are available for consultation. Write:

COLUMBUS-MCKINNON
Chain **CORPORATION**

(Affiliated with Chisholm-Moore Hoist Corporation)

136 FREMONT AVE.

TONAWANDA, N. Y.

Branch Offices: NEW YORK • CHICAGO • CLEVELAND

Probst and White, under the supervision of a special technical committee representing the NDMA membership. These National projected wood sash are offered in eighteen standard basic units, each basic unit an opening in itself.

The units may be installed individually or the various units may be combined, in height and width, to meet almost every installation requirement in industrial and commercial buildings, schools, hospitals, etc., and in any type of wall construction. The standardized frame is designed to accommodate either bottom pivoted in-projecting vents or top pivoted out-projecting vents without modification or change in the hardware requirements. Streamlined in every detail, these units provide a maximum of tight area per opening, thus combining beauty and utility. The operating hardware is friction controlled and holds the ventilator in any desired open position without danger of langing or slamming with resultant glass breakage. All necessary hardware for one complete unit weighs only about 3 pounds which is most appropriate at this time in conservation of critical metals.

Frames are completely factory fitted and all sash pre-fitted to exact size so as to minimize the installation labor in the field. All parts are treated with a toxic preservative to give them even greater durability under the severe service conditions imposed by modern construction. Since the ventilators are of the projected type rather than pivoted, screening or storm sash may be easily and economically installed. Screens are installed from inside the building and windows may be washed easily and safely from the inside. The largest individual sash is about 4'0" by 2'0", making them easy to handle, paint, glaze and install.

They are made particularly for manual operation and specially designed hardware is furnished with the units. When necessary, however, various types of mechanical operating devices are available for long line sections of horizontally projected ventilators.

TRAFFIC SIGNAL SWITCH



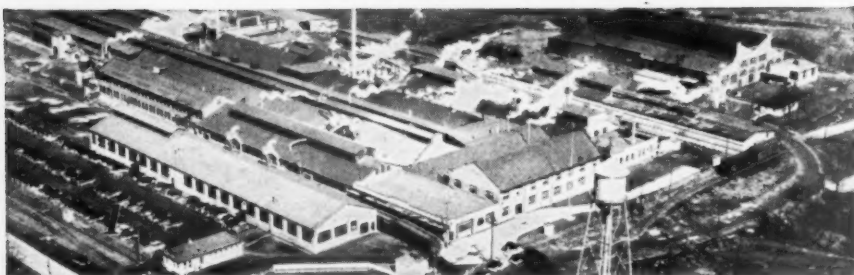
■ A new control switch developed by the General Electric Lighting Division permits satisfactory "dim-out" operation of traffic signals during a blackout. It allows illumination of the entire lens instead of a reduced area, making for greater traffic safety, but the light is not discernible from the air.

The device can be mounted in the base of the controller cabinet without drilling extra holes in the controller panel or

When writing Columbus-McKinnon Chain Corporation please mention Purchasing



When writing The Timken Roller Bearing Company please mention Purchasing



Carey BUILT-UP ROOFS over America!

PROTECTING HUNDREDS OF MILLIONS OF DOLLARS INVESTED IN VITAL PLANTS AND EQUIPMENT THROUGHOUT THE NATION

Industry knows that CAREY Roofs make good. A study of the records of thousands of Carey Built-Up Roofs shows that many are still on the job after 25, 30 and even 35 years of service.

The real reason for this exceptional service is simple and logical—over a half century of manufacturing experience, supported by serious scientific research.

In these critical war days, dependable roof protection is doubly important. Whether you require new roofs, or reroofing jobs, it will be to your advantage to discuss your needs with a Carey representative. A nationwide organization of experienced roofing contractors is at your call. Write Dept. 68.

THE PHILIP CAREY MFG. COMPANY

Dependable Products Since 1873

LOCKLAND, CINCINNATI, OHIO

In Canada: The Philip Carey Co., Ltd. Office and Factory: Lennoxville, P.Q.

1. Ames-Balfwin Wyoming Co.
2. Allegheny Ludlum Steel Corp.
3. The Florence Stove Company

making any wiring changes. It consists of a transformer and a single-pole switch with two positions. With the switch at the "normal" position the signal lamp burns at full brilliancy; at the "blackout" position, voltage is reduced and the lamp filament just glows. A visor must be provided for each signal lens to screen the upward light and decrease the range of the signal beam.

WORK GLOVE



Women in industry are demanding a flexible, comfortably fitting, but sturdy and economical general purpose work glove. Industrial Gloves Company of Danville, Illinois, has perfected such a glove for one of the largest employers of women workers.

Made of light weight horsehide, this glove will wear exceptionally well even on the toughest job—yet remains soft and flexible. Made in three sizes—small, medium and large to insure perfect fit and comfort. Has open back to provide coolness, as well as extra flexibility. An elastic web band across this opening in the back, keeps the glove snug fitting throughout its entire life. On the thumb and first two fingers is a patch—an extra thickness of leather that will not only add to the protection and safety of the operator, but will provide many extra hours of glove service. A two inch band of leather extends up over the wrist to provide protection for that vulnerable spot. Inseam thread sewed.

This glove may be purchased in pairs, all rights, all lefts or any combination of rights and lefts to the dozen pairs at no additional cost. This means not only a saving in dollars on your glove purchases, but assures your women operators of maximum hand protection at all times as single worn gloves may be replaced as required.

PORTABLE A.C. AND D.C. INSTRUMENTS

Portable a.c. and d.c. instruments for general field service use where an inexpensive unit is required, are announced by the Westinghouse Electric and Manufacturing Company.

Modern design, accuracy, sturdiness and reliability are the outstanding features of these units. The molded cases are fully insulated and magnetically shielded from stray field influence.

When writing The Philip Carey Mfg. Company please mention Purchasing

STRENGTH

Under load Blaw-Knox Electroforged Steel Grating develops maximum strength for section of steel used due to using maximum values of both straight and cross bars—no notching or cutting of either bar is permitted.

BLAW-KNOX STEEL GRATING is Electroforged into One Piece!

No bolts, slots, rivets, loose parts—the bars are permanently forged together for superior strength and permanence.

Blaw-Knox Steel Grating is easy to clean and paint—safe because of the unique twisted bar—delivers maximum open area for light and air.

Send for free paper-weight-size sample.

BLAW-KNOX DIVISION of Blaw-Knox Co.
Farmers Bank Bldg., Pittsburgh, Pa.

Name _____

Street _____

City _____

State _____



Good Fluorescent and Incandescent Lamps, and enough of them in the right places, will *increase your production, decrease your spoilage, improve the accuracy of your work, help maintain the effectiveness, energy and morale of your workers.*

The makers of Champion Lamps are keenly aware of the responsible part their products are playing in industry's war effort. Today's Champion Lamps, employing the very minimum of critical materials, are the very finest that can be made. You can depend on it — there is no better lamp buy.

The Champion Lamp distributor in your locality and the Champion organization are eager to help make *light work* better for you. May we help you on either your lamp or lighting problems?



Champion Lamps are licensed under General Electric Company incandescent and fluorescent lamp patents. Since 1900 they have been building a reputation for quality, dependability and value.

CHAMPION LAMP WORKS
Lynn, Massachusetts

A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO.

These instruments are available either with or without covers. The scale length at 3.2 inches a.c. and 2.8 inches d.c. and the units have an accuracy of + or -1 per cent of full scale. The instruments are equipped with a mirrored dial and a knife-edge pointer which aids in making close and accurate readings.

It embodies a variety of single, and multi-ranges providing for the measurement of a.c. volts, amperes and milliamperes: d.c. volts, amperes, milliamperes, and micro-amperes. Ranges and combinations of ranges have been carefully chosen to meet every need of test men, laboratory technicians and research engineers. Combinations such as four current and three voltage ranges make this the most complete and flexible instrument available in this classification.

TUBELES TIRE

■ Invention of a revolutionary heavy-vehicle tubeless tire—the goal of tire engineers for half a century—was announced by the B. F. Goodrich Company, this invention is of primary importance because of the savings it makes

GIVE YOUR TOWELS THE

Fibre Test!

COMPARE THEM WITH

STRAUBEL

Texturized

TOWELS

The length of the fibre in a paper towel indicates its quality. Straubel Texturized Towels are noted for their high absorption speed and capacity. Dampen and tear a Straubel Texturized Towel and you will see why it dries faster, leaves no fuzz on the skin and makes the hands feel so thoroughly clean. Ask your supplier for free testing samples.

Straubel

PAPER COMPANY
GREEN BAY, WISCONSIN



O E M Photo by Palmer, in an Allegheny Ludlum plant



STEEL IS FLOWING TODAY THAT WILL BE FLYING NEXT MONTH

Alloy steel, conceived in the mighty heat of electric furnace arcs, is just being born when it teems into ingot molds.

How soon can the raw steel in those ingots be brought to maturity as parts in finished warplanes (or tanks, guns, ships, munitions)? How much of it can be actually put to work, with only a bare minimum of scrap, "reject" and spoilage losses? In this war, a battle easily may hang on the way any one plant handles its problems of production and conservation.

The Allegheny Ludlum line-up of alloy war-steels includes stainless and heat resistant, tool, valve, nitriding and electrical steels. Information on their more effective fabrication and use includes certified "Blue Sheets" for engineers and technical men; "Handbook of Special Steels" for production men; "Elementary Discussions" of tool and stainless steels for training course use, etc.

● Tell us your alloy steel problems—particularly if yours is a converted plant, making unfamiliar products from strange materials. If we don't

have the answers in printed form, the services of our Technical and Field Staffs are also at your disposal.



Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

When writing Allegheny Ludlum Steel Corporation please mention Purchasing

fibro forged SOCKET SCREWS

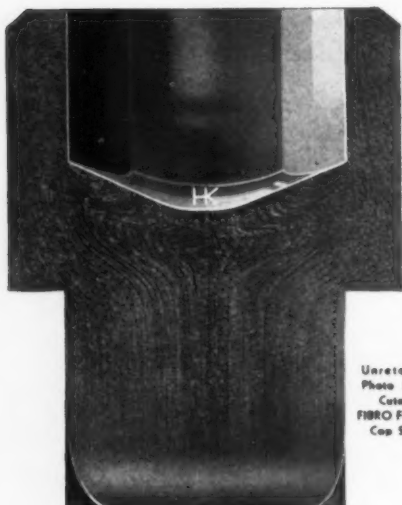
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THE RESULTS OF A SUPERIOR METHOD PATENTED BY

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FIBRO FORGED
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GUARANTEED
Unfailing
PERFORMANCE

HOLO-KROME SOCKET SCREW STANDARDS AVAILABLE

THE HOLO-KROME SCREW CORP., HARTFORD, CONN., U.S.A.

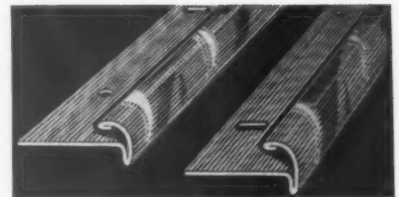
possible in rubber ordinarily required for inner tubes and flaps.

Use of a specially-designed locking member which retains the air in the casing is the secret of the development.

Substantial test results obtained by the company demonstrate its usefulness and ability to perform under all sorts of difficult road conditions. Further tests under other auspices are now being conducted.

The device can be mounted in a tire with ease in a procedure which is simple to learn and requires no special tools. In the event the tire is cut or otherwise becomes deflated, valuable time can be saved in repairs as there is no inner tube to be patched or replaced.

ROLLED METAL TRIM



■ One of the most practical non-drip sink edgings ever designed is now available in the line of rolled metal trims offered by The B & T Floor Company, Columbus, Ohio. Furnished in two sizes: R-171, for light weight Wall and

EVEN BEFORE the Rubber Shortage

STANZOIL

NEOPRENE GLOVES

Gave Better Hand Protection

at
**Lower
Cost
per Day**



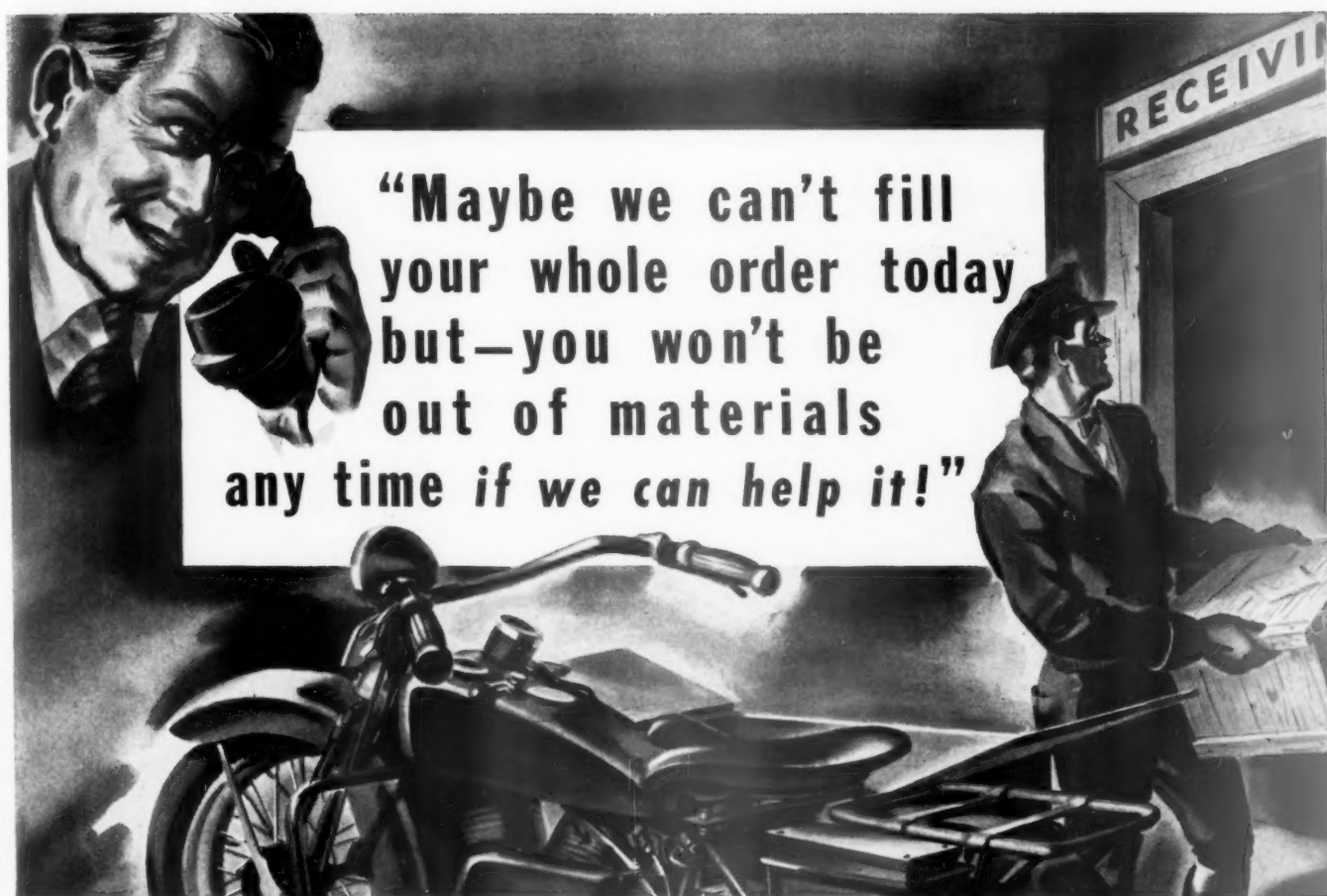
These remarkable industrial gloves are *not* a substitute for rubber you can't get—Stanz oils have offered you *improved* hand protection and glove economies for several years! Hundreds of industries have been taking advantage of these benefits. • Consider: They stand oils, greases, caustics, acids that quickly destroy natural rubber; they often last 3 to 7 times longer. They give more complete protection. They're comfortable. Styles, weights and sizes to meet your requirements. • The *best* protection of your workers and your production pays. Write us today for current data on deliveries.



Synthetic Rubber Division of
THE PIONEER RUBBER CO.
257 Tiffin Rd., Willard, O., U.S.A.
New York • Los Angeles

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This is your Industrial Supply Distributor's pledge to help you keep your contracts moving with never the loss of a minute's production if it can be avoided. It means he will put forth every resource to keep you furnished with the vital supplies and equipment you must have to keep up your share of the War Effort.

It will make your work easier, simpler, less costly, to buy through your own nearby Mill Supply House, because:—

- 1—Mill Supply Houses do their buying from literally hundreds of Manufacturers and are trained to keep hunting for what you need until they find it.
- 2—Their facilities are organized to handle all the complicated details of contacting, buying and expediting deliveries from scores of these suppliers, *every day*.
- 3—They buy outright large stocks

of supplies they know you will need—sometimes 25,000 or more separate items—then stock them for quick delivery to you.

4—They know Priorities and can help you obtain essential materials in cases where you do not have blanket authorization.

5—If they cannot complete your order in one delivery they usually can rush out an emergency supply saying "here's enough to keep you going—more soon."

Take your own Mill Supply Distributors into your buying confidence—let them serve you as a vital source of supply not only now, but permanently.

Our own great faith in them is based upon the many years' experience in which they have represented us as Distributors of Cle-Forge High-Speed Drills and Peerless High-Speed Reamers nationwide.

This incident is typical of the unusual services that many Mill Supply Distributors are rendering their customers during the Emergency.

The CLEVELAND **TWIST DRILL COMPANY**
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TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES
 30 READE ST. NEW YORK 9 NORTH JEFFERSON ST. CHICAGO 650 HOWARD ST. SAN FRANCISCO
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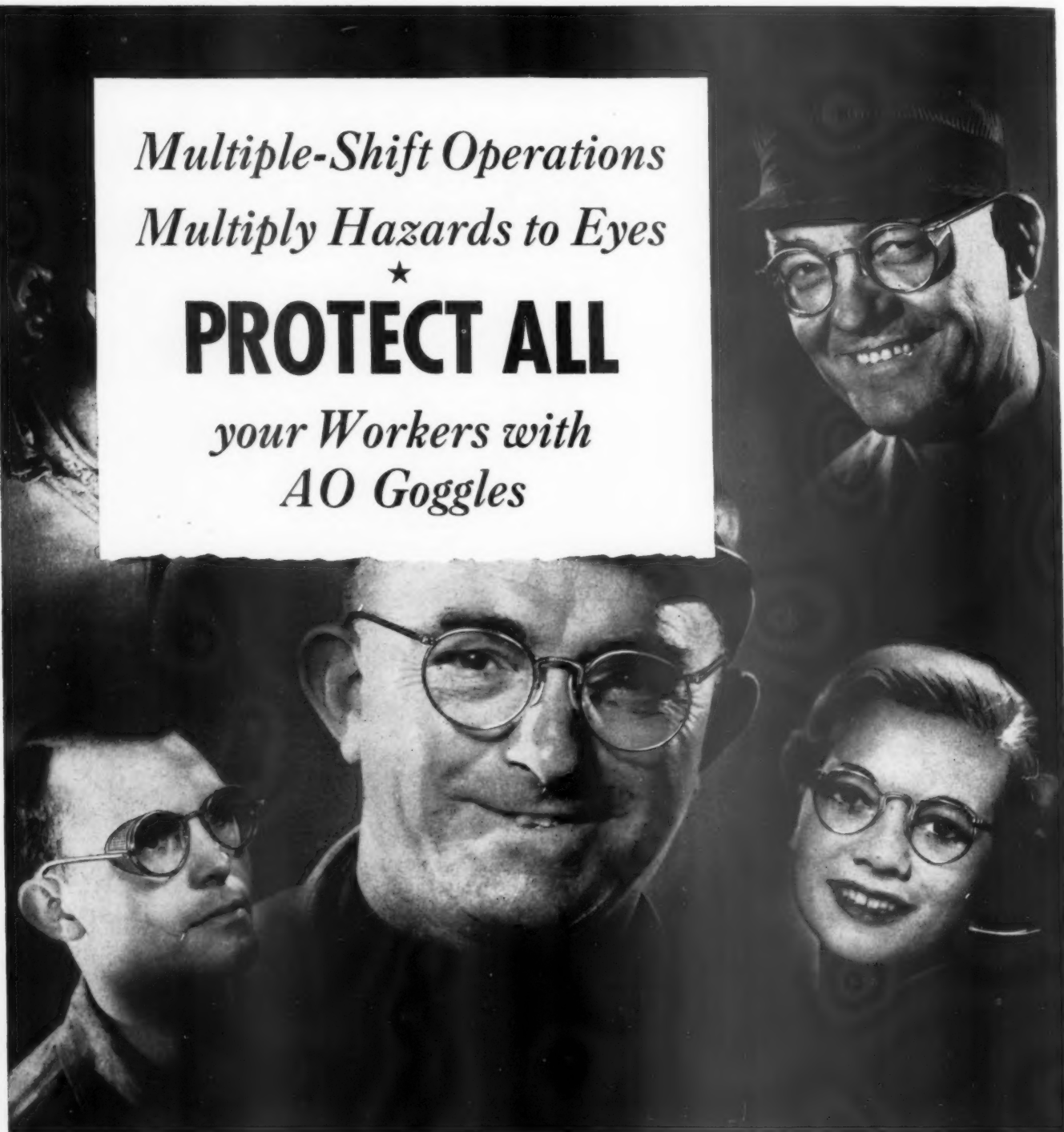
"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

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*Multiple-Shift Operations
Multiply Hazards to Eyes*

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PROTECT ALL

*your Workers with
AO Goggles*



Remember this: as the size of a working force increases, the possibility of eye accidents increases. Eye protection must keep step with employment. All workers, especially *new* and *inexperienced* ones should be given the right type of goggles for their work.

Put a complete eye protection program in your plant *now*. American Optical Company can help you — with a complete line of safe, comfortable goggles and cooperation to make your eye safety program effective.

THE American  Optical COMPANY
SOUTHBRIDGE MASSACHUSETTS



standard gauge materials, and No. R-171-A for $\frac{1}{8}$ " coverings. The section provides a small and neatly rounded head along the outer edge of the sink top or counters. It is also desirable as an attractive finish for outside wall corners, and is suitable for a number of other types of installation. The ease with which the section can be fitted around corners and curves adds to its utility. Available in 12' lengths only.

Numerous styles of linoleum insert trims as well as various other shapes for use as carpet trims, corners, edgings, and binding, nosings, and wall panel trims are available.

HYDRAULIC PIPE BENDING PRESS



■ The Baldwin Southwark Division of The Baldwin Locomotive Works has brought out a 200-ton hydraulic pipe bending press. Production experience



REPAIR CONCRETE to a TOUGH FEATHER EDGE

RUGGEDWEAR RESURFACER bonds solid and tight right up to irregular edge of old concrete. Won't crack and crumble at joint where ordinary patching materials first show signs of going to pieces. Used for repairing holes, cracks, ruts, broken places in concrete floors . . . or for a complete, durable overlay. No chopping or chipping required—mix the material—trowel it on. Sets up a smooth, heavy-duty rugged wearing surface . . . indoors or out. Dries fast.

Request Valuable
Descriptive Booklet
on "TOUGH FLOORS"

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FLEXROCK COMPANY
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Please send me complete RUGGEDWEAR information . . . details of FREE TRIAL OFFER—no obligation.

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OUR FILLING OF EVERY ORDER MUST BE BASED ON END USE!

When placing, or writing for information on orders for electric wire and cable, it is extremely important that you help us comply with WPB regulations by stating the *end use* for which you are ordering.

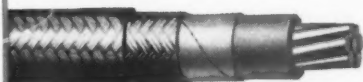
Precious time will be saved if this is done clearly and completely at the beginning. So, to help us slap the Jap and knock out the Nazi with all possible speed,

PLEASE USE WPB FORM
PD175 IN TRIPLICATE
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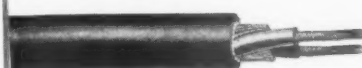
CONSTRUCTION AND MAINTENANCE



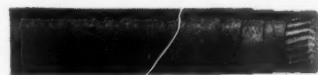
**ROEBLING RUBBER COVERED
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(regular rubber on war orders, emergency compounds for civilian use).



**ROEBLING VARNISHED CAMBRIC
POWER CABLES**
save rubber wherever they can be specified and used.



ROEBLING RUBBER CORDS (Type S)
(regular rubber on war orders, emergency compounds for civilian use).



ROEBLING CONTROL CABLE
For alarm and signal system use.



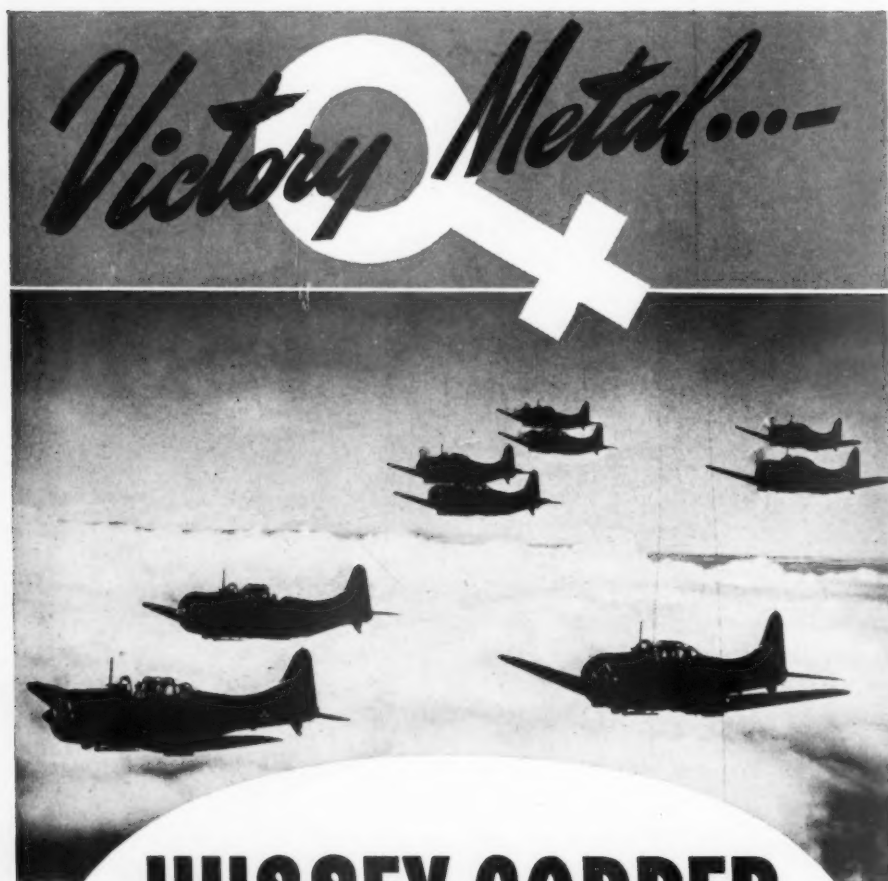
PROMPT SHIPMENT TO
MEET ESSENTIAL NEEDS

ROEBLING

ELECTRIC WIRES AND CABLES



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HUSSEY COPPER

...Vital in the Air!

● Only the best materials can match the rigid requirements of aircraft service . . . that's why Hussey Copper serves in our flying forces in so many ways.

Hussey Copper meets the demand not only for top quality but also for easy workability and uniformity which speeds parts production 24 hours every day.

Hussey Copper is truly a Victory Metal . . . serving well on both the fighting fronts and on the production lines.

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Copper

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Brass

C. G. HUSSEY AND COMPANY

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shows that because of its tremendous power, most bends can be made cold. This feature not only saves the time required to heat pipe, but eliminates distortion in the pipe resulting from cooling.

Self-contained, this oil operated hydraulic press is under perfect control of the operator at all times—a feature particularly valuable when difficult bends are made.

METAL PARTS WASHER

■ Sturdy-Bilt Equipment Corp., Milwaukee, Wis., announces a new metal parts washer for the soaking, washing, drying and preparation of metal parts, either machined, finished or rough; and for complete metal assemblies. This washer was specially designed for the cleaning of war production small parts, shells, cartridges, munition parts, etc.

It offers a long dormant soak besides the customary method of a powerful hydro washing. The parts are loaded and unloaded at a convenient platform. One operator is all that is necessary for both loading and unloading. The parts are then subjected to a long soaking in very hot light alkali solution water which loosens and removes all the dirt and chips. This is followed by very hot and powerful clean water washes and rinses to positively remove any alkali or remaining dirt or chips. There is then sufficient time to allow the clean parts to

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RAZOR-BACK
Only Shovel with a BACKBONE

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THE MANUFACTURE OF BROWN & SHARPE MAGNETIC CHUCKS
-- to give Industry the many advantages
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**FIVE
RECTANGULAR
MODELS —**
2½" x 5"
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**ROTARY
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9" Diameter

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For sale only in the U. S. A. and its Territories

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HOLTITE-Phillips

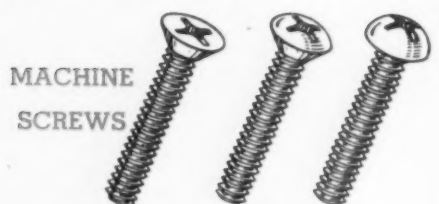
Recessed Head:: Self Centering

SCREWS & BOLTS

U. S. Patents 2,046,343, 2,046,837, 2,046,839, 2,082,085,
2,084,078, 2,084,079, 2,090,338, 2,016,810.



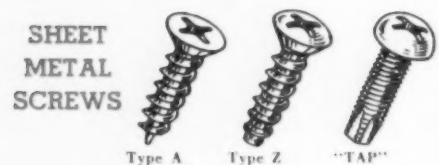
WOOD
SCREWS



MACHINE
SCREWS



STOVE
BOLTS



SHEET
METAL
SCREWS

Type A Type Z "TAP"

Reduce fastening costs with HOLTITE-Phillips Recessed Head Screws and Bolts. They provide faster driving, greater holding power, better appearance, reduced spoilage and other profitable advantages. They hold on the point of the driver to permit one hand starting and driving . . . a time-saving feature. Driver cannot slip to mar work or injure hands.

SET SCREWS



Bits are available for all manual or power drivers. Send for illustrated folder and samples.

CONTINENTAL

SCREW COMPANY

New Bedford, Massachusetts

Warehouse at Detroit, Mich.

thoroughly dry before reaching the unloading platform.

A simple "chip-remover" scrapes chips into a receptacle at one end. This "basket" is easily removed to be emptied—the chips, if of scarce metals, can be salvaged.

The entire unit is compact and efficient. The operating mechanism is not complicated. No adjustments need be made to clean a large variety of items. The flexibility of the basic design allows this washer to be adapted for use in most every war industry.

"TINLESS" SODER



■ As war makes its urgent demands upon "strategic materials" research must uncover suitable substitutes—which often turn out to be as good, if not better, than the original items.

In this picture an "old timer" tries his hand at a substitute for 50/50 soder. He is using a bar of Siloy soder (containing practically no tin), running a seam on a ventilating duct.

The L. B. Allen Co., Inc., Chicago, Ill., are now offering industry samples of this inexpensive and highly effective soder, together with the special Allen flux which aids in making it an efficient product for most common metals and jobs. Send generous sample of the soder and a suitable flux. If possible, send along details of your problem so that available information on procedures and methods may be sent.

CARBOZITE COATINGS

■ Contractors and sub-contractors will be interested in the new government-approved olive drab which has been added to the line of colors for Carbozite standard coatings, shop coating, and textile coating.

Standard coating—used for protecting roofing, siding, piping, machinery and all exposed steel work—resists the corrosion of acid, alkali, moisture, sulphur water, salt air or water, smoke, etc. It is available in black, red oxide, green, non-corrosive light and dark grey, and the new government-approved olive drab in consistencies for brushing, spraying, or dipping.

Shop coating, for shop prime-coats or product protection during shipping or storage, is a quick-drying coating which can be sprayed, brushed, or dipped, and will protect steel, non-ferrous metals,

etc., from moisture, fumes, salt air or salt water for long periods of exposure. It is being extensively used as a primer for structural steel in the shop and for protection of bright products being shipped in open cars or overseas.

Textile coating, is useful for waterproofing fabrics, tarpaulins, etc. The new olive drab color in this product will be of especial interest for contractors on war production where fabric is involved. Other products include high temperature stack coating, acid resistant mastic, marine coatings, and black-out black.

Made by Carbozite Corporation, Pittsburgh, Pa.

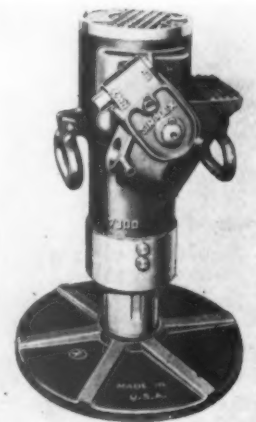
PRESSURE CONTROLLER

■ A safety device for manufacturing plants, especially those located in areas in which bombing is apt to occur, has been developed by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn.

Water pressure must be kept above certain limits in order not to become a hazard. Most manufacturing plants use water for cooling purposes, where a drop in pressure will cause damage unless the operator is warned immediately. War production plants are especially liable to two possible causes of pressure drop, aerial bombs and saboteurs.

The safety device consists of a pressure controller which will sound an alarm bell on pressure drop. This bell may be located any place in the plant most convenient for the person responsible.

SPEED SCREW JACK



■ Templeton, Kenly & Co., Chicago, Ill., announce the addition of a 25-ton standard speed, bevel gear, ball bearing screw jack, No. 7300.

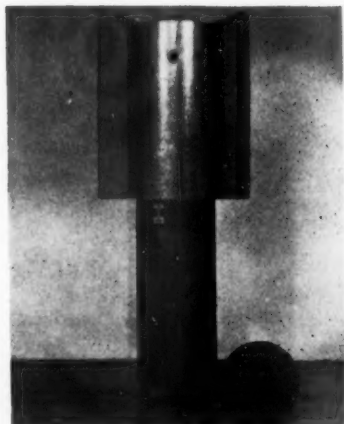
Designed for heavy duty lifting, lowering and skidding work, that the safe mechanical action, screw adjustment and enclosed ratchet mechanism combined with both toe and cap lift make it an ideal jack for all heavy industrial work.

Toe lift is a minimum of 11" from base, but jacks can be made with toe in any position to suit user's requirements, and the base design can be modified. It is guaranteed to lift its full rated

When writing Continental Screw Company please mention Purchasing

capacity of 25 tons on cap and 12½ tons on toe; has a full 6" lift and weighs only 82 pounds complete.

HOT WATER TANK JACKET



■ An economical way to conserve fuel and otherwise increase the efficiency of hot water tanks while enhancing exterior appearance of such installations has been made possible by the development of a hot water tank jacket manufactured by The Hinde & Dauch Paper Company, Sandusky, Ohio. Made of highly efficient patented air-cell insulation, the jacket can be quickly and easily installed by anyone, on all standard model 30 and 40 gallon hot water tanks to provide quicker heating and longer heat retention. In addition, basements, kitchens and bathrooms are kept more comfortably cool during hot summer months. Laboratory tests have proved the 5-ply air-cell insulation an effective, economical insulator. The new jackets are exceedingly easy to apply. Joint seals are quickly and securely made with long-lasting cloth tape matching the attractive wood grain, gray, and green finishes which are available.

FLOOR MAINTENANCE EQUIPMENT

■ The very considerable impetus which clean, slip-safe floors can give to factory output is now pretty generally recognized. Plant production superintendents will therefore be interested in the following analysis of floor maintenance problems and their solution.

In brief, maintenance equipment made by Hild Floor Machine Co., Chicago, Ill., contributes to the efficiency of war industries in five ways, as follows: saves time otherwise lost to shut-downs for maintenance; substantially reduces the accident risk; frees the time of maintenance men for more productive work; prevents damage to factory floors resulting from faulty maintenance methods; prevents damage to manufactured products.

Essentially this equipment consists of two units: (1) a motor-driven rotary scrubber, and (2) an easily portable vacuum machine. Each of these units may be used with a series of specially



HOLTITE *Special* PRODUCTS

We have the most completely equipped plant in the world for making Special fastenings and parts.



These special products are typical of the many styles we are constantly producing.

Send samples or specifications. Prices quoted promptly.

● The regular line of HOLTITE Industrial Fastenings comprise a wide range of dependable, precisely made items—

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TAP
WOOD
DRIVE
LAG
SIDE KNOB
BOBBIN
SHUTTLE
MACHINE
LOCK CAP
SPECIAL
WASHER HEAD

BOLTS

STEP
HOOK
SINK
STOVE
CLOSET
HANGER
FIN HEAD
METER

NUTS

MACHINE SCREW
HEXAGON
SQUARE
STOVE BOLT
SEMI-FINISHED
WING

WASHERS

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RODS

STOVE
CHAIR
LADDER

RIVETS

TUBULAR
FUSE PLUG
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CUTLERY

MISCELLANEOUS

KNURLED PINS
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SLOTING SAWS

"Thread-Forming" Sheet Metal Screws

HOLTITE-Phillips
Recessed Head Screws

"Lock Washer Assembly" Screws

"Lock-Tite" Screws

Lock washer and
screw in one piece

CONTINENTAL SCREW COMPANY

New Bedford, Massachusetts • Warehouse at Detroit, Mich.

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THEY'RE TOUGH . . . THESE 125 lb. GATE VALVES



Fig. 2129
Bronze Wedge Disc Gate
Non-rising Stem

Fig. 2125
Bronze Double Disc Gate
Rising Stem

And they're proving it in countless plants in all industries. The extra strength built into these tough bronze valves comes in good stead in meeting the severe demands of continuous operation. Now more than ever they are proving to their users that it pays in the end to buy good valves first.

Figs. 2125 and 2129 are outstanding examples of the ruggedness and dependability that are inherent qualities in all Lunkenheim products.

Since virtually all materials used in the manufacture of valves are on the list of critical materials, valve users are urged to furnish the highest possible preference ratings and proper "end use" Allocation Classification Symbols on their orders. This will be of mutual helpfulness.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U.S.A.
NEW YORK CHICAGO
BOSTON PHILADELPHIA
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

LUNKENHEIMER VALVES

designed attachments which fit it for a particular job. Plant maintenance superintendents often discover unusual jobs for this equipment. For the most part, however, this equipment is used to keep factory floors free from oil, grease, dirt and dust.

Wherever machines are operated, and particularly where metals are machined, oil and grease are bound to accumulate on floors . . . some splashed or spilled and some by condensation from cutting compounds. On the floor, oil and grease combine with dirt, metal cuttings or other waste to form a gummy, sticky coating. Tramping feet and stock trucks serve to pack this greasy dirt into a hard, bumpy crust. Subsequent spillage of oil forms a slick on this crust, creating a condition of extreme hazard for foot or wheeled traffic.

If the nature of the dirt on floors is primarily oily (rather than hard-caked grease), it must be removed by scrubbing with a cleaning solution. When an oily surface is wet, it becomes so treacherous that no one can be allowed to walk on it. The section being cleaned must therefore be closed down while the floor is being scrubbed and allowed to dry.

Doing this job with hand brushes or mops is slow and leaves the floor wet and slippery for a considerable length of time. The bulkier mechanical scrubbing devices sometimes require closing down a considerable area, and do not get into spaces adjacent to and under machines.

PERMAC Cleaning Compounds

Produces
a CLEAN Surface
Before Finishing

PERMAC removes all grease, oil and polishing composition from metals quickly, safely, without injury to surfaces.

PERMAC is widely used in war industries; helps solve the new cleaning problems that have come up.

Our representatives, located in principal cities of the U.S. are ready to serve you. Warehouses in large industrial centers carry adequate stocks to insure prompt delivery to your plant.

Write for Illustrated Folder

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PRODUCTS CORPORATION

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Main Office: 50 Court St., Brooklyn, N. Y.
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A Natural for War-plant Lighting

THE NEW 4-LAMP BALLAST

Operates four 100-watt fluorescent lamps, yet costs no more than a Tulamp 100-watt ballast.

Reduces copper requirements of plant lighting circuits. Operates over a line-voltage range of 250-280 volts; applicable to circuits in the 265/460-volt-Y class.

Cuts ballast electrical losses 46 per cent for a given installation—an appreciable power saving.

Saves nearly 50 per cent in ballast materials for a given number of lamps.

THE new G-E four-lamp ballast—made possible by General Electric's revolutionary sequence-starting circuit—opens the way to simplified fluorescent fixtures that cost less, weigh less, and use much smaller amounts of critical materials: copper, iron and steel, and aluminum.

Compared with two 100-watt Tulamp ballasts—the most economical type previously available—the new four-lamp ballast requires 48 per cent less copper, 47 per cent less iron and steel, and 50 per cent less aluminum.

Savings in Copper for Plant Circuits, Too

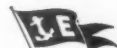
Circuits carrying power at the higher voltages (between 250 and 280 volts) necessary for the operation of the new ballast require much less copper than circuits carrying the same amount of power at lower voltages. For example, on a single-phase circuit only one-fourth to one-third as much copper is required to carry power at 265 volts as would be required to carry it at 115 volts. Many new war plants—particularly those with load-center distribution systems—will have Y-connected circuits of 254/440, 265/460, or 277/480 volts, to all of which the four-lamp ballast can be connected

line-to-neutral. Other plants converting for war production can often provide one of these voltages on their lighting circuits.

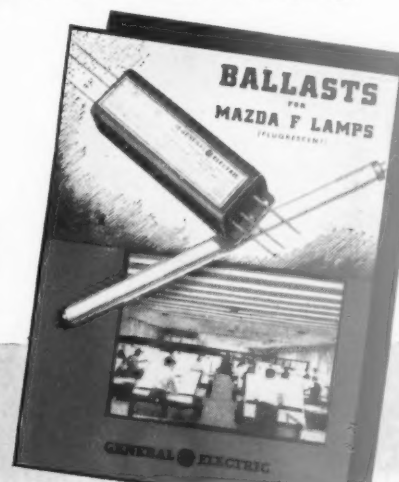
The four-lamp ballast has the same mounting dimensions as the G-E Tulamp ballast.

Power factor of the four-lamp ballast, like that of the Tulamp ballast, is above 95 per cent.

Write today for complete information on this remarkable new ballast. Ask for Bulletin GEA-3293D. It contains information on the complete line of G-E ballasts for all MAZDA F lamps from 4 to 100 watts. *General Electric Company, Schenectady, N. Y.*



The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in five plants manufacturing naval equipment



GENERAL ELECTRIC

406-9-5205

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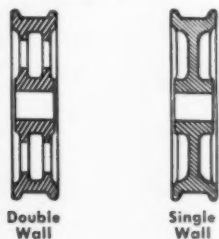
Double-Wall Design of Crane Wheel Assures Safety and Long Life

Manganese steel crane wheels of ordinary single web design have repeatedly chalked up superior service records over single wall crane wheels of ordinary iron or steel. The ability of 13% manganese steel, while surface-hardening under pressure and friction, to retain a tough internal structure reduces the incidence of cracking of the treads and fractures in the web at flanges or hub.

These advantages of manganese steel plus "Double-Wall" design, developed by Amsco, present an unsurpassed combination for maximum service life and greatest safety.

Users have reported that besides the longer service life of the wheel the rails also last longer. This reflects the fact that manganese steel wheels take on a polish from friction, whereas ordinary wheels, being relatively brittle, develop minute surface cracks in the tread which tend to abrade the rails.

An examination of a cross-sectional drawing of single and Double-Wall crane wheels brings out the structural superiority of the latter. The greater overall strength and the more rigid support given the wheel rim and hub are obvious.



The cut-away view of the Amsco Double-Wall crane wheel shows the

flanges continuous with the walls (A) affording high resistance to side thrusts. The walls are internally connected by cross-members (B) from the hub to the inside circumference of the rim, thus assuring a strong support for the tread as well as a rigid tie for the walls.

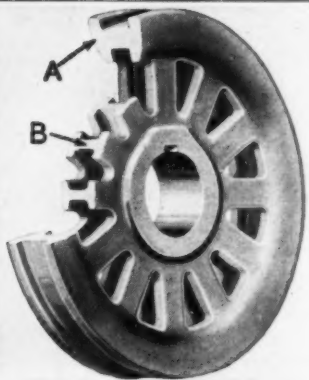
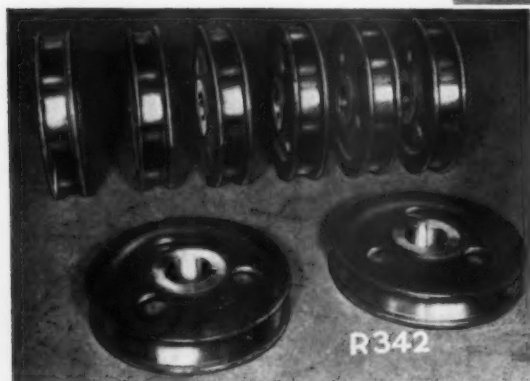
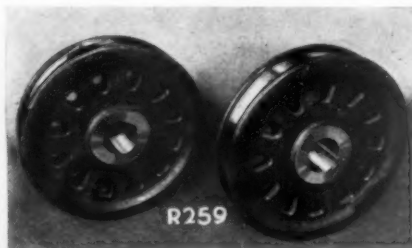
A foundry organization that could make its own wheels stated:

"We have referred your letter of January 29 regarding performance of manganese steel track wheels to our factory who advise us that manganese steel crane wheels have been found superior to cast iron chilled wheels. The Amsco wheels wear evenly and there is no web breakage."

A car builder reports over 20 years service from the original lot of their design of double-wall crane wheels, shown (R342) which operate under very hard and almost continuous service. Two 24" wheels of Amsco design are also shown (R259).

Their long service life, conserving vital metal, and their wide safety factor, protecting crane operators and workers from hazards, recommend the use of Amsco Double-Wall crane wheels in war production plants.

Send for crane wheel questionnaire which simplifies quotations.



Amsco
AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRASS & FOUNDRY CO.
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO. OFFICES IN PRINCIPAL CITIES

Manganese Steel Castings for shocks and abrasion.
Chromium-Nickel Alloy Castings for heat and corrosion resistance.
Power Shovel Dippers, Dredge and Industrial Pumps.
Welding Materials for reclamation and hard-surfacing.

This floor scrubbing machine, on the other hand, easily works in congested areas. Due to its special "Shower-feed" construction it puts only a minimum of scrub-soap solution onto the floor to get it really clean. The scrubber is immediately followed by another operator using a vacuum equipped with a special double-bladed squeegee. This device picks up the dirty scrub-soap solution so thoroughly that floors dry almost instantly. Where these two machines are operated together as a cleaning unit, workmen need be asked to step away from their machines for only 60 to 90 seconds while floors are being scrubbed. There need be no interruption to continuous three-shift operation.

Where the factory floor is built of wood blocks, wet cleaning is seldom attempted without this equipment. Water seeping under the blocks often causes them to buckle or loosen from their base.

PERMANENT ZONING PAINT

■ A new type of traffic zoning paint, which gives maximum resistance to all types of traffic and holds color permanently is announced by the Thomson-Porcelite Paint Co., Philadelphia, Pa.

Especially developed for industrial plant use, the new marking and lining material overcomes the problem of too-frequent re-painting of traffic lines on factory floors and parking lots.

Drying hard for traffic in 15 minutes, this paint, may be applied with a mini-



Compact, Easy to Install Electric PRODUCTIMETERS

COUNT with absolute accuracy small pieces . . . parts that must not be marred . . . articles too light in weight for mechanical contact. Ideal for remote control installations.

MODEL S-D1-MF above especially adapted for use with the "Electric Eye."

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DURANT MFG. CO.

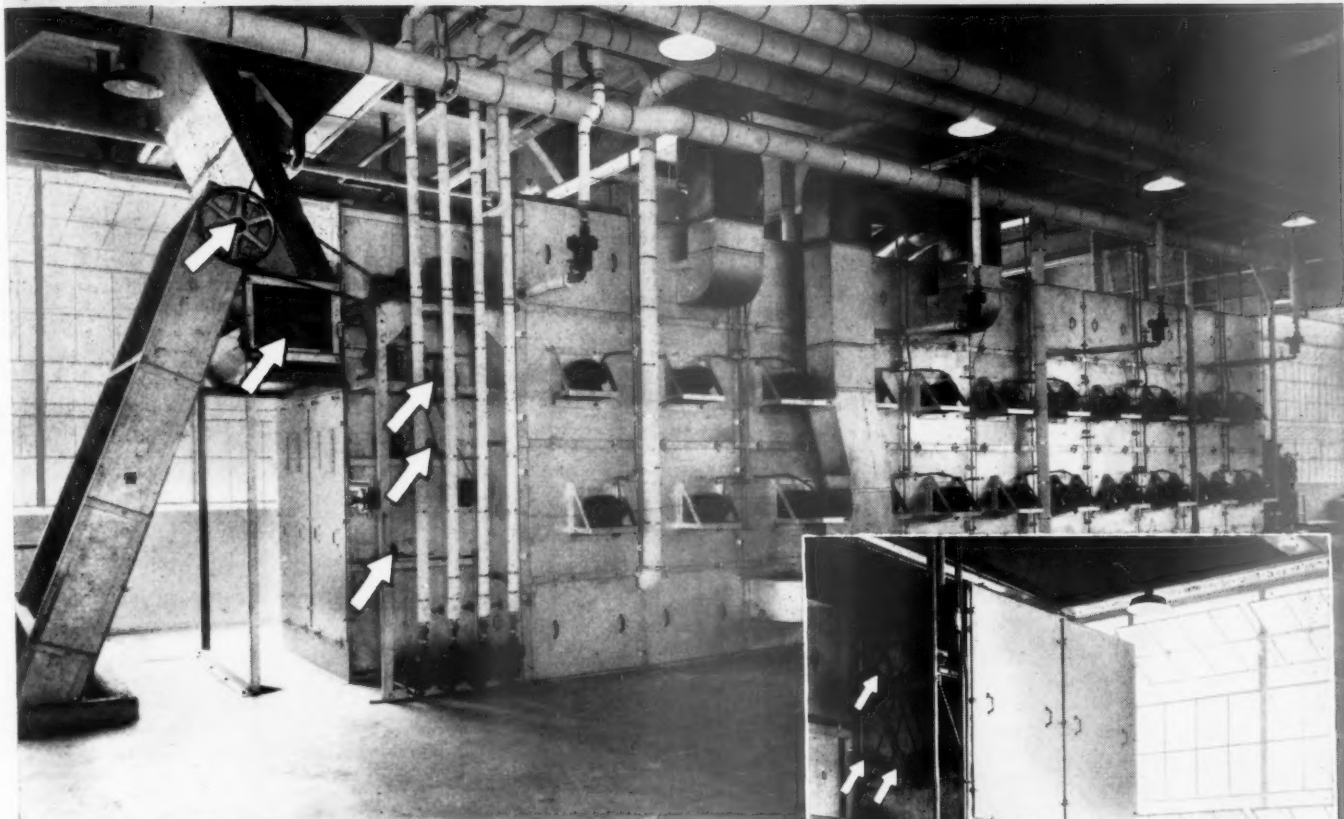
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THE SPEEDOMETERS OF INDUSTRY

When writing advertisers please mention Purchasing

"Cast-Off" RUBBER GOES BACK TO WORK



Important reclaiming step is capably handled by the new SARGENT 3-PASS DRYER . . . equipped with FAFNIRS

Here's one of the new types of equipment made for a *new job* in an industry "squeezed" by the War. Working in several of the large rubber plants, Sargent Dryers handle the important job of taking the moisture out of chopped-up, caustic-soaked, reclaimed rubber. The Dryer pictured above handles more than 4000 pounds of "chips" an hour — and keeps a large sheeting mill busy on a 24-hour schedule.

In this particular Sargent 3-Pass Dryer, Fafnir Ball Bearing Pillow Blocks are used at practically every "turning point" to assure friction-freedom and low-cost operating efficiency. The several conveyors in the dryer are supported on Fafnir Ball Bearing Take-Up Units which maintain desired tension without friction or drag.

This multiple installation is typical of the part Fafnir Ball Bearing Units are playing in maintaining the uninterrupted output of essential "war" products. The Fafnir Bearing Company, New Britain, Connecticut.



Rubber reclaimed with the help of these Dryers is used in the manufacture of battery boxes, rubber heels, tool handles, floor matting, and provides material for many other molded parts.

FAFNIR

BALL BEARINGS

THE BALANCED LINE—FOR
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When writing The Fafnir Bearing Company please mention Purchasing

mum of dislocation. The material is applied by either machine or hand over all types of interior or exterior surfaces.

In practical tests in large industrial plants it has maintained exceptional visibility for periods in excess of 7 months. Free samples for testing on your own premises available.

AUTOMATIC OILER

■ To prevent waste of large quantities of oil, cleaning and decorating expenses, and eliminate fire hazards, building superintendents are rapidly replacing old-fashioned oil cups on their elevator

door checks with Trico visible automatic oilers as shown in the picture.

This controlled method of oiling supplies only the correct amount of oil at the right time. Installation can be made quickly and inexpensively, and no attention is required except to keep a supply of oil in the reservoir. The crystal-clear bottle tells at a glance when refilling is necessary.

Made by the Trico Fuse Mfg. Co., Milwaukee, Wis.

BEARING WASHER

■ Drastic restrictions on deliveries of new anti-friction bearings have sent maintenance men searching for methods

of improving bearing care to reduce the need for replacements. An adaptation of a production type bearing washer for industrial plant use has been developed to meet this need so that bearings can be washed and thoroughly dried for periodical inspection and then repacked with fresh lubricant. The unit is easily portable and has a sealed compartment to prevent evaporation loss of the solvent solution. Provision is made for a compressed air dryer which blows the bearing dry and clean, making the whole operation complete and easy in a minimum of time. The unit weighs only ten pounds and handles a full range of bearing sizes.

An additional unit for repacking the cleaned bearing with fresh grease is a second development. With five pounds of clean lubricant in its base the bearing is simply placed on top of the unit and a lever forces the clean grease completely through the bearing without waste or muss and without danger of dirt and contamination being carried in the lubricant.

Developed by lubrication engineers of the Croft organization the units are being distributed by the Ahlberg Bearing Company, Chicago, Ill.

BAGS FIGHT BOMBS



■ Paper bags, containing 40 to 45 lbs. of dry sand, have been found effective weapons in combating incendiary bombs. As every Air Raid Warden knows, smothering with sand offers the best means of bringing a burning magnesium bomb under control so that it may be safely removed from the premises.

The bag shown here was designed by the Chase Bag Company, Chicago, Ill., working with the Pittsburgh Housing Authority and the Toledo Fire Department, and is similar to those used in England.

The filled bag is sealed against moisture, and will stand ordinary handling, yet will burst on a wooden or cement floor when dropped from a height of three feet. In use, the filled bag, unopened, is dropped either directly on the burning bomb, or it may be dropped a few feet away and the contents then shoveled onto the bomb. The former is the method used in England, but the latter is recommended by the United States Civilian Defense Authorities.

ZIRCONIUM for industry

Today, Defense and non-defense manufacturing has emphasized the ever-increasing uses and possibilities of the element ZIRCONIUM and its compounds in industry. TAMCO Zirconium compounds are being used successfully in the manufacture of Refractories, Electrical Resistors, Resins, Dye Extenders, Water Repellents, Catalysts, Abrasives, and Ceramics.

TAMCO'S development engineers and research laboratories have long been cooperating with the industry. Write today, for a TAM resident field engineer to call at your plant and discuss the potential use of Zirconium Compounds with you.

TITANIUM ALLOY MANUFACTURING COMPANY

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Zirconium Palmitate	Zirconium Silicate Cements
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When writing Titanium Alloy Manufacturing Company please mention Purchasing

*More than one way
to skin a cat...*

OR BUILD A GUN!



PURDY KNOWS the problems of steel in terms of their solution in the shop. When ordinary methods fail, or ordinary materials are lacking, Purdy men know there's bound to be another way—and the complete PLANET line of spring steel, tool steel, drill rod and cold-drawn steel is here to back them up.

Whether you're building guns or tanks, if you have a problem of steel supply, of steel application, or one that calls for out-of-the-ordinary ingenuity in the use of steel, get in touch with Purdy for prompt action. A. R. Purdy Co. Inc., 792 Greenwich St., New York, N.Y.

ONE PROBLEM SOLVER...

PLANET Blue Tempered and Polished Spring Steel is one Purdy product that has solved a lot of problems. We carry a large stock of this spring steel in thicknesses from .002 to .078 and widths from one-eighth to six inches, and our equipment includes a modern slitting machine which can give you any width desired within that range.

Our complete stocks of spring steel include the following:

ROUND HIGH CARBON: Polished Music Spring Wires • Hard Drawn and Coppered Drawn Wire • Black Annealed Spring Wire • Oil Tempered Spring Wire.

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BAR STOCK: Hot Rolled SAE 1095 Rounds, Flats, Squares • Hot Rolled SAE 9250 (Silico-Manganese) Flats.



PURDY *War steels* PLUS *Know how*

When writing A. R. Purdy Co., Inc. please mention Purchasing

PAINT IN PAPER CANS



■ Paper paint cans are the latest contribution of The Sherwin-Williams Co. to the war conservation drive. The top and bottom of the container, which is

the result of several months of experimentation at the company's Chicago Plant, are metal discs, but the body is made entirely of cardboard impregnated with an insoluble substance.

No tin at all is required. In fact, the company restricted the use of tin plate several years ago when engineers at its Chicago Can Plant found that alloy coated plate made just as good paint cans as tin plate.


This alloy coated plate is now being used for the metal ends of the new container, but further experiments are already under way which, it is hoped, will result in the complete elimination of alloy plate and permit the metal discs to be made from lacquered black plate.

The biggest problem in developing the

paper paint can was finding a method of moisture-proofing the cardboard. The common ice cream container could not be used because it would soak up the oils and solvents in paint, resulting in a soggy can and deteriorated contents. This obstacle was overcome by chemically treating the cardboard and placing an impregnated paper lining inside the can to prevent "wicking" or absorption.

The company does not claim that the new substitute is just as good as an all-metal container. A new label carries the line—"War Emergency Container—Handle with Care". However, the paper can has been tested extensively for wicking, for evaporation, and for shipping and storage qualities, and in each respect it has proved completely satisfactory.

Inside diameter of the new container, now in production in the quart size, is slightly less than the all-metal can because the walls are thicker. The height has been increased to allow for the change in diameter and for the generous "bite" with which the ends clamp the paper body. In addition to quarts, a half-pint and a gallon size will also be manufactured.



**BROTHER,
THIS IS WAR!**

War jobs demand speed with accuracy

Arkwright gives you both!

Those blueprints whirling through the machine must be sharp and clear — or else! Mistakes on war jobs can be as bad as sabotage — why risk them by using inferior tracing cloths? Arkwright's superb, uniform, closely-woven finish is your best protection. It assures perfect jobs — now and for years to come. Give your men this inexpensive aid to better work. Arkwright Finishing Company, Providence, R. I.



Arkwright TRACING CLOTHS

AMERICA'S STANDARD FOR OVER 20 YEARS

STABILIZING CONTROL



■ A development of unusual importance in the field of control engineering has been announced by The Foxboro Company, Foxboro, Mass., under the name of "Hyper-Reset". This is not an instrument or a mechanism, but a control function, available in the newly-designed Model 30 Stabilog Controller, for application where process-lag is considerable. Its importance is demonstrated by tests in which it consistently re-established process stabilization, following an upset, in one-quarter of the time, and with only one-half the upset effect, as compared with a similar controller having only the usual reset.

It reduces the effects of a process disturbance by making initial temporary additional corrections, which are proportional to the rates of change of the measured value caused by the disturbance. The normal reset follows, establishing stabilization. But the several control functions carried out by "Hyper-Reset" are simultaneously and automatically adjusted. No tuning-in is necessary. No more than two process adjustments are required.

When writing Arkwright Finishing Company please mention Purchasing

JOINING TIPS TO TOOLS

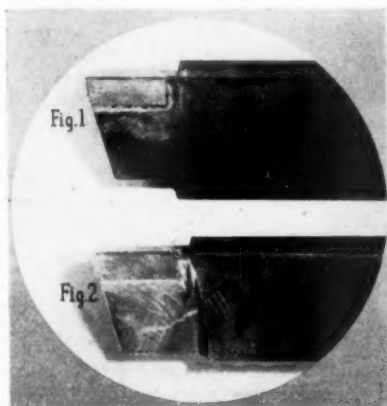


Fig. 1 shows assembly just as it comes out of the brazing oven and indicates the small amount of flux scale left on the work.

Fig. 2 indicates the seam piece as in Fig. 1 after the flux scale has been removed, showing the perfect bond obtained by the Krembs process.

■ In view of the vital role which metal working tools are playing in the war production program, the process of joining butting tips to tools, developed by Krembs and Co., Chicago, Ill., assumes major importance.

This is an improved method of joining carbide and all other types of cutting tips and cutting blades to tool shanks. The plan is adapted to both small and large scale production and can be used with the furnace, torch, or spot-welding methods.

The process comprises a specially developed "Fluxined-Spelter" which is used to brush onto the contacting surfaces of both the cutting tip and the tool shank. The work is then assembled to form a tight fit and brazed. When completed, the finished braze looks like a gold-plated joint with absolutely no waste of joining material and the cleaning job is almost nil. By this process, 100% perfect bonds are obtained.

While there are several other methods of doing this operation, many of the users who have tried this process agree on its time-saving advantages and its superior results, as shown in the accompanying photograph.

SOCKET SCREW DIMENSION FINDER

■ A unique socket screw dimension finder that helps speed up work is being offered free by the Parker-Kalon Corporation, New York, N. Y. At a glance, this finder gives designers, engineers and production men all important dimensions of the standard sizes of socket head cap screws, stripper bolts and set screws. The finder is ten inches in diameter and is printed in two colors on heavy card stock. This offer is limited to designers, engineers, drafting and production men in key positions who

write to Parker-Kalon on their company letterhead, mentioning their title and the make of socket screw they use.

AUTO TRANSFORMERS

■ Two improved type A current balancing auto transformers for differential protection of power transformer banks are announced by the Westinghouse Electric and Manufacturing Company.

The improved unit has been streamlined and clip terminal connections replace the cable leads. Compact design means less mounting space, lighter weight, and a conservation of vital materials. The pressed steel case elimi-

nates heavy iron castings; and clip terminals eliminate sixteen rubber insulated cable leads.

Clip terminals on the terminal block make it possible for connection to be made to the customer's leads without removal of any parts from the transformer. The diagram nameplate is mounted on top of the terminal block, and figures on the edges of the nameplate indicate the lead numbers. The mounting plate is arranged for flat surface mounting or pipe frame mounting by means of U-bolts.

Units are available in ratings of 50 and 100 volt-amperes with a nominal ampere ratio of 10.8/5 to 5/5.

2

FOUNDRIES

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**CASTING
NEEDS**



● Transmission gear cover—a Forest City casting used by a large automotive manufacturer.

FOREST CITY has two efficient, modern foundries—both equipped to produce precision castings on schedule and as specified.

We can supply machine tool castings, such as gear boxes, drill press heads, gear box covers and housings in gray iron, semi-steel or high test semi-steel in sizes from a ½ ounce to a half ton.

Send us your inquiries or ask for a representative to discuss your casting requirements.

Gray Iron,
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and High Test
Semi-Steel
Castings

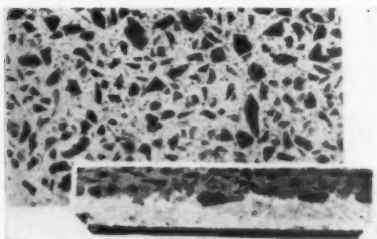
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THE FOREST CITY FOUNDRIES CO.

2500 WEST 27th ST. • CLEVELAND, OHIO

When writing The Forest City Foundries Co. please mention Purchasing

NON-SLIPPERY FLOORING



■ Insurance statistics show that deaths from falls total about 26,000 per year, or 28 per cent of the year's total for all

types of accidents, ranking second only to deaths from automobile accidents. Not included are the thousands of injuries which were not fatal. Many of these accidents, due to slippery, defective or worn flooring, have resulted in huge man-hour losses in industrial plants.

Designed to produce non-skid floors, either wet or dry, Walter Maguire Company, Inc., New York City, are offering Cortland emery aggregate, a mixture of scientifically graded large and small, sharp, hard particles of mineral emery, rating next to diamond in hardness.

For application, emery aggregate and nothing else is mixed with Portland cement and water for the floor topping. Even when the floor is wet, it provides a firm non-slip gripping surface. This quality improves with wear, the floors actually becoming safer with use, because, as the rough emery particles are exposed by wearing away of the cement, their gripping action improves. Where loads are moved by hand-trucking operations, much greater pushing traction is obtainable.

In addition, this flooring greatly increases the load-bearing qualities. This floor mixture specimen will support a load of more than 14,000 pounds, while tests indicate that a standard test specimen of ordinary concrete floor mixture will break under a load of 6,200 pounds. Heavy, loaded trucks will not destroy the surface and the hardness of the emery particles resist wear.

High tensile strength (resistance to pulling apart) is also a factor in a floor's serviceability. Moving wheel loads exert a tractive pull as well as a pressure on floor surfaces. Weak floors can be torn apart. Standard test specimens of ordinary concrete floor mixture, broke under test at 620 pounds tension. This floor surface withstood over 1,000 pounds tension.

*Send for
Your Copy*

**Off the Press
on or before
August 15th**

New, Complete Carboloy Tool and Blank Catalog

We announce the release—on August 15th—of a special catalog, containing—under one cover—a complete listing of specifications and prices of Carboloy standardized tools and blanks available for war production. Designed to provide a quick, ready reference for those selecting tools for war work, this new catalog lists a wide range of products available in stock for prompt deliveries. As a special supplementary feature, the designs of a number of special types of tools commonly used have been standardized. Specifications and prices of these are included—eliminating delays for quotations, blueprints, etc. Also contains suggestions for saving time and money on your made-to-order tool requirements.

Reserve your free copy today, you'll find it to be a handy, time-saving guide.



Carboloy Co., Inc., 11191 E. 8 Mile St., Detroit, Mich.
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Important Listings

Standard Tools.....	(Stocked)
(Incl. new sizes to be stocked)	
Standard Blanks.....	(Stocked)
(Incl. new sizes and styles to be stocked)	
Standard Boring Tools.....	(To be stocked)
Diamond-Imreg. Wheel Dressers.....	(Stocked)
Diamond-Imreg. Grinding Cones.....	(Stocked)
Masonry Drills.....	(Stocked)
Carboloy Guide Rings.....	(Stocked)
Carboloy Brinell Balls.....	(Stocked)
Lathe and Grinder Center Tips.....	(Stocked)
Lathe and Grinder Centers.....	(Partial Stock)
Twist Drill Blanks.....	(Standard Design)
Shear Type Tools.....	(Standard Design)
Cut-Off Tools.....	(Standard Design)
Grooving Tools.....	(Standard Design)
Plug and Ring Gage Bushings.....	(Standard Design)
Drill Jig Bushings.....	(Standard Design)
Roller Turner Tools.....	(Standard Design)
Staples-Type Exp. Reamers.....	(Standard Design)
Solid Reamers.....	(Standard Design)
.....
.....

RUBBER SUBSTITUTE



■ The machine tool industry which is one of the bottlenecks of our Victory production problems, uses thousands of hard rubber feed wheels for centerless grinders. Safety Grinding Wheel & Machine Company, Springfield, Ohio, research engineers, have discovered a substitute for rubber in the manufacture of regulating wheels. They have named their new product SAFTOID.

These feed wheels for centerless grinders cost less and last longer than the same wheels made of rubber.

INTERCOMMUNICATING SYSTEM

■ Intercommunication systems for two-way use to five masters or five substations, is being made by Talk-A-Phone Mfg. Co., Chicago, Ill. These systems consisting of five station master, one sub-station, and cable, were designed for the expediting of vital war production.

When writing Carboloy Co., Inc. please mention Purchasing

WAGNER IS PREPARED TO SUPPLY YOUR MOTOR, TRANSFORMER AND BRIDGE BRAKE NEEDS!

Polyphase Squirrel-Cage Motors—1/6 to 400-hp.

Explosion-Proof Motors—3/4 to 125-hp.

Multi-Speed Motors—1/2 to 125-hp.

Totally-Enclosed Fan-Cooled Motors—1/2 to 125-hp.

Type H Hydraulic Bridge Brakes.

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Noflamol Transformer, (Non-Inflammable Liquid Filled.)

Constant-Current Regulators.

Distribution Transformers.

Power Transformers

YOU can look to Wagner for your motor, transformer and bridge brake requirements... You can depend upon Wagner too, because Wagner's large modern plant is devoted to the production of these items—products that have met the exacting requirements of industry by giving dependable, trouble-free service.

If you are stepping up your war-production... If you are planning the replacement of motors, transformers or industrial brakes—consult Wagner.

MOTORS

Wagner motors are built in a wide range of types and sizes with electrical and mechanical characteristics to fit the requirements of all types of motor-driven machinery and equipment. Bulletins MU-182 and MU-183 illustrate and describe the complete line of Wagner motors. Everyone responsible for the purchase and maintenance of motors should have these bulletins.

TRANSFORMERS

No matter what the requirement may be, Wagner can furnish the right transformer for the job. The line includes power transformers, distribution transformers, Noflamol transformers and constant-current regulators. Bulletins TU-180 and TU-181 give complete information on the line of Wagner transformers. These bulletins contain information of value to every transformer user.

HYDRAULIC BRIDGE BRAKES

Today, Wagner bridge brakes are standard equipment on most overhead cranes. They are ideal for new installations as well as conversions from mechanical brakes. Available in type H for inside cranes, and type HM for outside cranes where automatic parking attachment is desirable. You should have bulletin IU-20. It will be sent on request.

**FIELD ENGINEERING
SERVICE!...**

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

**MAIL COUPON NOW
FOR FREE BULLETINS**

25 sales and service branches are located throughout the country. Trained field engineers are always ready to assist you in selecting motors, transformers, or hydraulic bridge brakes, to meet your particular requirements.



Gentlemen:

I would like to have free copies of motor bulletins, MU-182 and MU-183 ☐ Transformer bulletins TU-180 and TU-181 ☐ Hydraulic bridge brake bulletin IU-20 ☐.

Name _____ Position _____

Company _____

City _____ State _____

P E42-6

MOTORS • TRANSFORMERS • BRIDGE BRAKES

When writing Wagner Electric Corporation please mention Purchasing

Diagram is typical five station installation of the Master Selective type.

Installation can be made to include all masters to a total of five, a master and a maximum of five sub-stations, or a combination of masters and sub-stations to a total of five units. Operation on all systems is on 110 volts a.c. or d.c. Economy is again stressed in economical operation, approximately fifteen cents per month. Master station mechanisms are housed in sturdy walnut cabinets. Sub-stations are completely enclosed in durable metal cases.

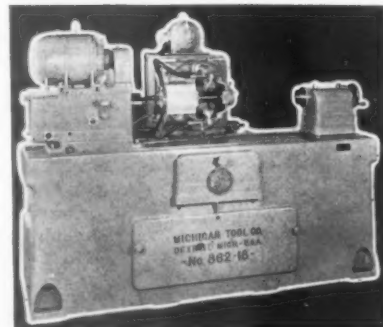
In a system having one master and a set of sub-stations known as the Master Selective type, stations can be placed at

any distance up to 2000 feet from each other and volume can be adjusted by means of the volume control. This system also has the exclusive "Silent Feature".

Also available is the Combination Master System which permits the use of two or more masters in combination with sub-stations. Sub-stations may be called by either master. The super selective system uses all master stations and permits a number of two-way conversations to be carried on in complete privacy. Units of these systems may also be placed as far as 2000 feet from each other, and the volume may be adjusted.

All of these systems are available for use with 10, 20, 30, 40, 50, etc., stations.

GEAR FINISHERS



■ Following closely on the announcement of a new 865 Series of crossed-axis gear finishing machines for unusually large gears, by Michigan Tool Company, Detroit, Mich., an entirely new series of heavy duty machines for gears up to 24 inches in diameter, designated as the 862 series, is now announced. This series is suitable for finishing gears used in speed reducers, machinery of various types, large engines, turbines, etc., and is available in 2 sizes.

The flexibility of the machines permits the application of the crossed-axis principle of gear finishing to a wide range of gear sizes. Gears as small as 2 1/4 inches in diameter may be finished with the 862 machines. Face widths up to 20 inches may be accommodated. The gears may also be finished when mounted on long or large diameter shafts, thus avoiding errors due to mounting the gears on the shafts.

The flexibility of the machines also permits selection of the most desirable method of finishing for any specific gear type, taking into consideration the face width, diameter and shaft length of the gears to be finished.

In all methods, the work drives the meshing cutter. In the first method, particularly suited to finishing wide face gears, the cutter, in addition to having an infeed toward the gear, is also reciprocated parallel to the axis of the gear.

This is accomplished by placing the slide which carries the cutter head in a horizontal position. The cutter itself is mounted on an anti-friction bearing spindle, with its axis at an angle to that of the gear, when viewed from the front of the machine. A vernier adjustment is provided for setting the angle of the cutter head.

When the machine is started, the cutter head reciprocates laterally, sweeping the cutter back and forth across the face of the gear as the two rotate in mesh. At the end of each stroke, the cutter carrying head is also fed slightly toward the gear. When desired gear size has been reached, infeed stops and the cutter reciprocates a few more times without infeed to provide the desired finish on the gear teeth.

Only JOHNSON BRONZE makes every type of SLEEVE BEARING



A dependable SOURCE of SUPPLY

● There is one right type of bearing for every application. . . one that will deliver the greatest performance for the longest period of time. Johnson Bronze can help you determine the exact type to suit your requirements. Our facilities cover the production of every known type . . . our experience goes back more than thirty years. Why not consult with Johnson Bronze first?



JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

450 S. MILL STREET • NEW CASTLE, PA.

When writing Johnson Bronze please mention Purchasing

PROCESSED WOOD

■ Wartime Industry is finding many new and profitable uses for a unique development in processed wood known as "Densewood". It is ordinary wood, reduced by a special process of shrinking to its solids without destroying its structure. In its shrunken state, it is many times stronger than ordinary wood, tough as metal, has greater resistance to abrasion, heat, splitting, yet it is resilient, shock and vibration-resistant.

A recent adaptation of particular interest is its use as rollers in a high production conveyor system. Various materials had been used unsuccessfully in this operation. Rubber rollers wore down too quickly. Maple wood rollers were tried, but they wore out too rapidly.

Densewood rollers were designed for the conveyor and to date they have been highly successful. They offered more resiliency, ran smoothly and quietly, did not scratch the product, and have already demonstrated much longer wear than any other material.

It has already been successfully used for a long list of products: mallets, soft-face hammers, pulleys, rollers, bearings, clicking blocks, driving pins, and many other parts and products. It is particularly valuable today as a substitute for many critical materials in Wartime Industry. It is processed by the Densewood Corporation, Elkhorn, Wis.

ABRASIVE CUT-OFF MACHINE



■ An abrasive cut-off machine is being manufactured by The Challenge Machinery Company, Grand Haven, Mich., to handle any metal—hard or soft, tubular or solid, including hardened tool steel.

The machine has a capacity up to one inch round and has an adjustable table, 15 x 14 inches. It is equipped with an elastic cut-off wheel, 6 x 1/32 x 1/2 inches, and an adjustable safety guard above the wheel to protect the operator's eyes. The belt on the side is also guarded. A ball bearing type spindle is used. An adjustable miter gage is included for cutting-off operations.

This machine can be plugged into any light socket. The base is made of cast iron, and an all-steel stand, 16 x 22 x 34 inches, is available.

PAINT

■ A new paint product that primes, seals and finishes on any interior surface in one coat, has been announced by American-Marietta Co., Chicago, Ill. The product has been formulated for maintenance painting of industrial, institutional and commercial properties, with qualities that permit ease of application with minimum labor.

Designated Valdura Singlekote, it combines the hiding power and economy of water-type paints with washability, durability and performance of oil-type coatings. It may be applied to surfaces previously coated with calcimine or case-in paints, providing the old covering is bonded, or tight to the wall. While it

easily covers dirt, it is not recommended for use on oily or greasy surfaces. High hiding power permits coverage of dark surfaces with a single coat, and the product is self-leveling. It sets within two hours, dries within 12 hours, and provides a dead-flat finish when viewed at a 90-degree angle.

Interior surfaces that may be covered are plaster, concrete, brick, wallboard, wood, wallpaper and metal. Coverage is up to 750 square feet per gallon.

It is packed in 1-gallon cans, 5-gallon pails, and in drums. It is available only in white, but may be tinted with alkali-resistant colors in oil. Packed in a concentrated form, one gallon provides five quarts of paint when mixed with one quart of turpentine or mineral spirits.

Everlasting Fastenings

BRASS
BRONZE
COPPER
EVERDUR
MONEL
STAINLESS

Harper's Fastenings are fighting the Axis and fighting corrosion. They are being used on a multiplicity of war equipment... such as ships, planes, guns and tanks... because they successfully defy rust, corrosion and other tough conditions. Practically speaking, they are "Everlasting."

4320 STOCK ITEMS
... of bolts, nuts, screws, washers, rivets, and accessories in the non-ferrous and stainless alloys. Many are "hard-to-get." Specials manufactured to order. 4-color illustrated catalog free to executives.

The H. M. HARPER COMPANY, 2606 Fletcher St., Chicago; 45 W. Broadway, New York City.

HARPER Chicago
EVERLASTING FASTENINGS

When writing The H. M. Harper Company please mention Purchasing

PERSONALITIES

in the NEWS

R. L. Tindal, Purchasing Agent for the Nickel Plate Railroad since 1926, has been named to serve in the same capacity for the Chesapeake & Ohio and Pere Marquette Railroads. At the same time the following promotions were announced in the C. & O. purchasing department: S. R. Secor becomes Assistant to

the General Purchasing Agent, J. R. Clary and W. R. Bowers are named Assistant Purchasing Agents.

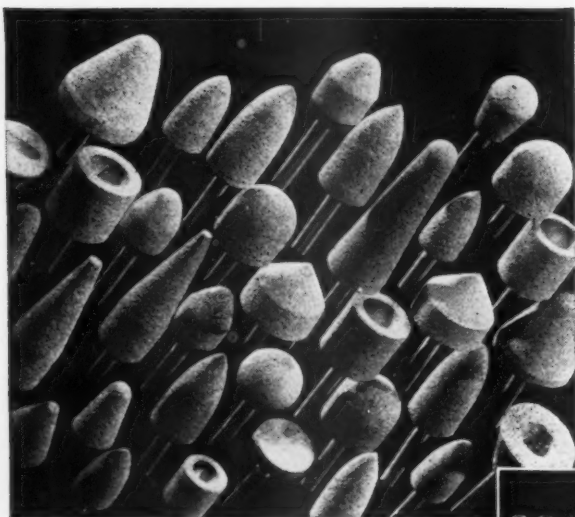
Francis J. Courneen, Purchasing Agent of the Dinion Coil Co., Rochester, N. Y., has been appointed Assistant to the General Manager of that company.



R. J. BAHR

R. J. Bahr has been appointed Purchasing Agent for the Radio, Television and Electronics Department of the General Electric Company, with headquarters at Schenectady, N. Y. Mr. Bahr has been with the organization since 1920, and prior to his recent advancement was buyer for the Receiver Division at the Bridgeport, Conn., works.

FINISHING THE *JOB* BEHIND THE LINES



CHICAGO MOUNTED WHEELS

Made of V/T Super Bond, they have real stamina, give unmatched performance and last 150% to 300% longer than ordinary wheels.

Chicago Wheels were the first small wheels mounted on steel shanks. Today there are over 200 different shapes to serve you—made in a variety of abrasives, grains and grades, mounted on shanks of various lengths and diameters of 1/4", 3/32", 1/8" and 3/16".

TRY ONE ABSOLUTELY FREE

Tell us the kind of job, size and wheel speed you use, and we'll send you a test wheel postpaid.

BRAND NEW CATALOG—Just off the press, this book is prepared in the modern manner—loads of illustrations, concise descriptions of the complete line of Chicago Mounted Wheels. Send for copy.

CHICAGO WHEEL & MFG. CO.

Makers of Quality Products for Over 40 Years

118 S. Aberdeen St., Chicago, Ill.

Keeping up with Uncle Sam's victory drive for more tanks and guns and planes, **Chicago Mounted Wheels** are doing a big finishing job in shops everywhere — taking care of every kind of delicate or tough grinding job faster, smoother and better.



HI-POWER GRINDER

A real production grinder that is saving many man hours. Weighs 3 lbs. yet is so well balanced that fatigue is practically eliminated. Has enough power to drive a 2 1/2" diam. wheel. Speed 17,000 r.p.m. In case with 3 Chicago Mounted Wheels, Drum Sander and Bands, extra Collets, Wrenches, Dressing Stone, \$38.50.



C. O. RICHARDS

Clifford O. Richards has been appointed Purchasing Agent of the Taylor-Wharton Iron and Steel Co., with headquarters at the company's Easton, Penna., plant. He succeeds R. C. Schaeffer, resigned. Mr. Richards has been Assistant Purchasing Agent for the past year and a half. Prior to that he was associated with the Fitz Chemical Co.

W. W. Kelly, General Purchasing Agent of the Santa Fe Railroad System, has been appointed director of the Section of Materials and Equipment, Office of Defense Transportation, Washington.

Thomas G. Ebright, Purchasing Agent of the Joseph Bancroft & Sons Co., Reading, Pa., owners of the Reading Cotton Mills, has retired after 42 years of service with the company.

<input type="checkbox"/>	Send Hi-power	<input type="checkbox"/>	118-8
<input type="checkbox"/>	Free Wheel.	<input type="checkbox"/>	Catalog
	Size		
Name			
Address			

When writing Chicago Wheel & Mfg. Co. please mention Purchasing



some wars are won
before they start

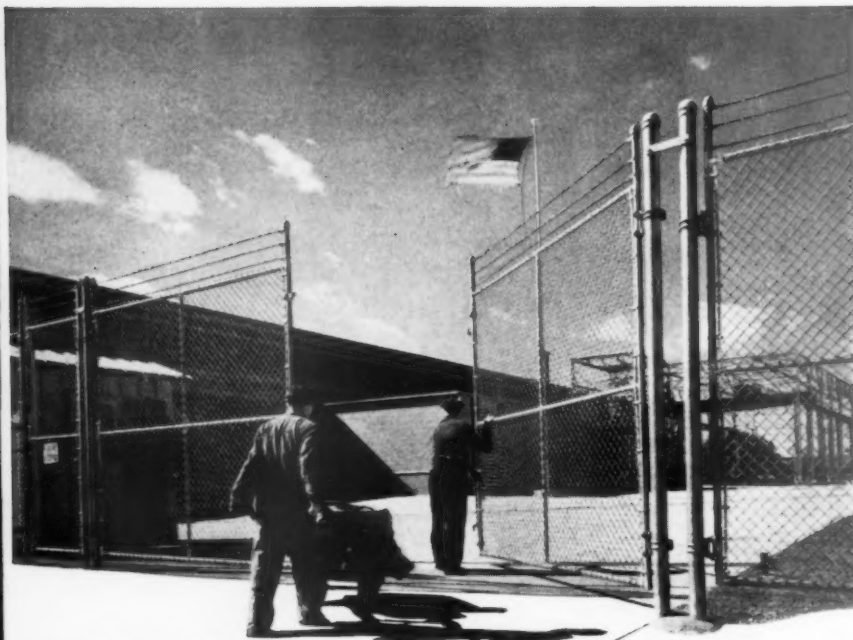
Victory may take time. But its foundations were laid long ago by the kind of thinking that has made American fighters and workers respected the world over. When, 17 years ago, men had developed, tested and perfected Preformed Wire Rope they were only following the American tradition of trying to do the job better. Preformed did not seem an urgent necessity, judged by the standards of 1924. But today, under war pressure, Government and Industry are demanding all the Preformed they can get — and more and more of it. Because, now, most men in the heavy industries realize that Preformed Wire Rope wears longer, speeds work, reduces accidents, cuts costs. And by lasting longer, Preformed saved enough steel in one year, for example, to build a striking force of more than 500 tanks. Preformed Wire Rope was not planned for war. But it started years ago to help win it.

Preformed wire rope
Conserves America's Steel

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER

PAGE FENCE

America's First Wire Fence — Since 1883



GUARDIAN OF TOP-SPEED PRODUCTION TO DEFEAT ENEMIES OF LIBERTY

• Production time is now more precious than ever before. Plants must be protected against dangerous delays caused by hostile trespassers. • Safeguarding industrial property has been a major function of sturdy Page Fence since J. Wallace Page originated woven wire fence in 1883, and founded the company which has been a leader in important fence developments. Safeguarding the fence investment through localized, responsible engineering and erecting service is also a Page achievement. More than 100 factory-trained, long-experienced local firms which own their own plants, make up the PAGE FENCE ASSOCIATION, Headquarters: Monessen, Pennsylvania.

VICTORY FIRST
At the Page mills, men, machines and materials are on an all-out schedule for production of fence to protect plants working on Government orders

See ACCO advertisement in this issue, page 114

PRODUCT OF PAGE STEEL & WIRE DIVISION—AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONN.

Here — Millions of BOLTS-NUTS-SCREWS for Defense-

These are the products you can use on production job after production job with the assurance that General Screw Manufacturing Company products will help you standardize, with uniformity, for economy and speed in production.

**GENERAL SCREW
MANUFACTURING CO.**
1234 W. MONROE ST. CHICAGO, ILL.



H. W. ZIMMER

H. Ward Zimmer, formerly General Purchasing Agent of the Hygrade Sylva Corp., has been appointed General Manager of Operations for the company's Receiving Tube Division, which includes three plants in Pennsylvania and one in New England. Besides his managerial duties, he will be in charge of equipment design and production, and general division purchasing. Mr. Zimmer has been with the company twenty-two years. His first executive position was Division Purchasing Agent at the St. Mary's (Penna.) Lamp Plant, where he later became General Manager. From that position he went to Emporium, Penna., as General Purchasing Agent for the company. Since 1935 he has been in production work, and prior to his recent advancement was serving as General Manufacturing Manager of the Radio Tube Division.

J. V. Burwinkle has been appointed Purchasing Agent for Bernalillo County, New Mexico, with offices at Albuquerque. He succeeds J. B. Velasquez, who resigned after ten years in that position, to enter the Army.

Dr. V. E. Wellman has been named manager of the newly created chemical and pigments department of the Purchasing Division, The B. F. Goodrich Co., Akron, Ohio. The new department, according to A. D. Moss, Director of Purchases, will be responsible for the development of new sources of these materials and for their procurement for both the chemical products and rubber manufacturing divisions of the company. Dr. Wellman has been with the Goodrich organization since 1929, as manager of the chemical laboratories and special technical assistant to T. G. Graham, Vice President in charge of manufacturing operations.

W. K. McClure, General Purchasing Agent of the Wilson Jones Co., Chicago, recently observed the completion of thirty-five years in purchasing work for that company and its predecessor organization, the Chicago Shipping and Receipt Book Co. Starting as a one-man department in a small Chicago plant, Mr. McClure has kept step with the

When writing advertisers please mention Purchasing

steadily expanding business and now heads a purchasing department with offices at Chicago and Elizabeth, N. J., and serving a coast-to-coast business. He is one of the twelve charter members of the Chicago Purchasing Agents Association, founded in 1915, and maintains an active interest and participation in its activities.

G. E. Holmquist, Purchasing Agent of the Lumbermen's Mutual Casualty Co., Chicago, has been named Assistant Secretary of that company and of the newly organized American Motorists' Insurance Co.

Ivan D. Nevill, formerly of the Oil Center Tool Co., has been appointed buyer for Arthur G. McKee & Co., of Houston, Texas. Mr. Nevill is President of the Houston Association.

C. G. Holmes has been appointed Purchasing Agent of the Torrance, Cal., works of the Columbia Steel Co. He succeeds William M. Nye, who is retiring from active business after a long career in purchasing work.

Robert J. Alcorn has resigned as Purchasing Agent of the Buhl Stamping Co., Detroit, to become Purchasing Agent for the Universal Cooler Corp. of Marion, Ohio.

Philip M. Pritchard, formerly with the Equipment Sales Division of the Hygrade Sylvania Corp. at Chicago, has been transferred to the company's New York office as expeditor for the factory purchasing department.

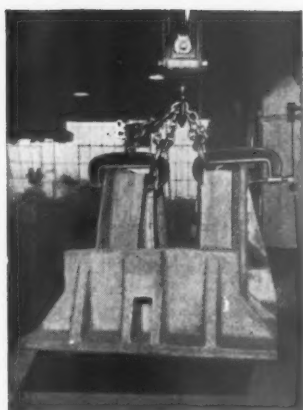
Charles N. Strong, formerly Purchasing Agent of The United Electrical Coal Companies, Chicago, has been named Purchasing Agent for the Island Creek Coal Co. of Holden, W. Va.

A. E. Collins, Assistant Purchasing Agent of the Shell Oil Co., at San Francisco, has been appointed Chief of the Petroleum Machinery and Equipment Section of the War Production Board at Washington.

Joseph H. Lambrix, Purchasing Agent of the USL Battery Corp. at Niagara Falls, N. Y., has been transferred to the purchasing department of the Electric Auto-Lite Co., Toledo. Harry Juday, formerly USL Purchasing Agent at Oklahoma City, succeeds Mr. Lambrix at the Niagara Falls plant.

Maurice C. Owens has been appointed Purchasing Agent of the Monarch Tank & Metal Fabricating Co., Perry, N. Y., succeeding Russell R. Reed.

Orrie De Nooyer, Purchasing Agent for the Forstmann Woolen Co., Garfield, N. J., has been appointed a member of the Bergen County Vocational School Board, to administer the affairs of the new school which was authorized last November.



• Because they never give, these **ARM-STRONG Heavy Duty "C" Clamps** are safely used, day after day, to carry these gigantic steel automobile body dies where the slightest spread or spring or the least slippage of the screw would result in disaster.

• Here is dependable quality that you too can rely on. Look for the **Arm-and-Hammer Trade Mark**. It guarantees a better clamp.

ARMSTRONG

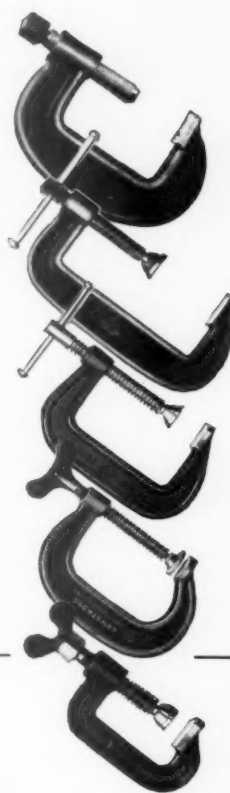
Drop Forged "C" Clamps

HEAVY DUTY "C" CLAMPS

Drop Forged from special steel, heat treated to give extra strength and stiffness. These stronger clamps have long hubs and alloy steel screws. Capacities from $\frac{3}{4}$ " to $\frac{1}{2}$ ".

MEDIUM SERVICE "C" CLAMPS

A strong clamp adapted to general use that gives maximum holding power consistent with convenient weight. Drop Forged, heat treated body. Special steel screw with free acting swivel. Capacities from 2" to 18".



LIGHT SERVICE "C" CLAMPS

A light, strong clamp, fast operating. Ideal for general shop use, for assembling, holding airplanes, automobiles, boats, etc. Forged, heat treated body, special steel screw. Capacities 2" to 12".

DEEP THROAT "C" CLAMP

This clamp is designed with an extra deep throat to give maximum clearance required by body builders, woodworkers, welders, etc.

TOOL MAKERS' CLAMPS

Drop Forged and heat treated to increase toughness. Screws are also drop forged, have square neck to take wrench and come plain or with swivel end. Capacities 2" to 12".

Eastern Warehouse
and Sales:

199 LAFAYETTE ST.
NEW YORK

Armstrong Bros. Tool Co.
"The Tool Holder People"
303 N. Francisco Avenue
Chicago, U. S. A.

STOP costly delays in PRODUCTION with WALTON TAP EXTRACTORS



WALTON TAP EXTRACTOR grips the broken tap firmly so that it can be backed out easily without damage to threads or work. Does the complete job. Saves time in production and maintenance work.

Sizes from #4 to $1\frac{1}{2}$ "

4, 3, or 2 flute styles

Ask for Folder #151

THE WALTON COMPANY
HARTFORD, CONN.

Introducing a Miracle of
Nature Which Has Played a Leading
Role in Making **HOWARD BOND**
the Nation's Business Paper



Located a short distance from Urbana, Ohio, home of Howard Bond, are the Ohio Caverns . . . one of the state's scenic wonders. Its weird rock formations serve as natural filters, feeding a vast hidden lake of pure, cold, sparkling water which has been tapped by the city of Urbana for human consumption . . . and by The Howard Paper Mills for use in the manufacture of Howard Bond.

THE HOWARD PAPER MILLS

URBANA, OHIO



Business **MACHINES** *and Stationery* **STORES**

RUBBER STAMPS SPEED WORK AND ELIMINATE ERRORS

With many office aids difficult or impossible to secure,
the lowly rubber stamp takes its place in the front line of
the battle for better and faster methods

THE original functions of rubber stamps were to make individual printed forms applicable to more uses, to save the time of office and plant personnel, to reduce or even eliminate the possibilities of some kinds of errors, to permit identification of work in process and of materials being stored or shipped, and to establish individual responsibilities of personnel. Rubber stamps still serve all of these purposes, and to better effect than ever before since modern stamps are better, give sharper impressions, have more types of inks available, and are in wider varieties so that keener selections can be made of types to use.

Reclaimed rubber is being used in making these stamps, and stamp makers report no trouble to date in filling demands. While rubber stamps have been mentioned specifically in the current salvage drive, and have contributed hundreds of pounds in the form of obsolete stamps that were merely gathering dust in plants and offices, their manufacture does not rate high as a consumer of critical material and, within reason, should be able to continue furnishing the needs of business—which ought to have all possible aids toward speeding up operations in these hectic days. This is one office supply which still can be had—and can be made to compensate for shortages in some other supplies such as typewriters and duplicating machines and the like.

One mimeographed form, printed receipt for money, work in process follow-up ticket, gummed label format, etc., plus a series of properly planned rubber

By E. L. CADY

stamps, can be made to serve the purposes of shelves full of individualized variations of such papers. The time of mimeographing machines, stock clerks, messengers who must go to stock rooms for supplies of forms, and stenographers who otherwise would have to type in the necessary data, can be conserved.

Rubber stamp inks specially made for Hectograph devices are available—copy for this kind of reproduction can be applied to the gelatine more rapidly with rubber stamps. Signatures in special signature inks can be applied to multi-graphed letters and announcements while those papers are being multi-graphed, thus assuring life-like signatures applied with mechanical accuracy.

Methods like these save shelf space, desk drawer space, filing cabinet space and the like.

Rubber stamps of the kinds which have replaceable figures and letters, are being used by a large machine shop to cut off some of the common errors made by employees. With old hands being drafted or transferred to positions of higher responsibilities, and clerical forces rapidly expanded, this shop found increasing difficulty in making sure that proper dates and exact hours of the day were entered on production control forms. Changeable figure rubber stamps were adopted for all dating and timing insertions on these forms, with the figures changed by office managers or supervisors only and the type which is not

in use kept in the exclusive control of these executives. The clerks can apply only the figures which are in the stamps, and errors of date and hour are possible only if executives make them.

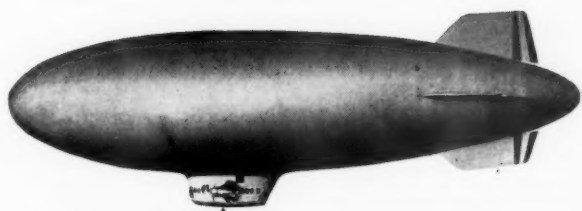
In one stock room, rubber stamps which have blank space panels mortised out of the middle are used. The counter clerks simply stamp forms with legends which read "Received," "Dispensed," etc. The recipient of anything dispensed puts his initials within the panel. Then the record clerks put the dates and hours in the panels, check the forms against the perpetual inventory cards, apply rubber signature stamps to the forms to show that this has been done, and pass the forms along for checking against purchase records. The counter clerks cannot make the error of recording a receipt of materials when a dispensing was what actually happened, for only a dispensing operation would be initiated by a recipient. And since a single printed form covers both operations, it is practical to use printed forms which list whole groups of items and permits the catching of errors before they have caused confusion and delays.

Personal initials or shop numbers of employees are on fixed dies in the adjustable operation-recording rubber stamps in a food plant. Each operator therefore may adjust or "set" his own stamp, and errors are instantly traceable to the point and to the operator where they started.

The speed with which modern

Speed Up Engineering Changes!

How aircraft parts manufacturer licked the problem of engineering changes—with the help of the Mimeograph duplicator



Leakproof gas tanks . . . wing and tail assemblies . . . other aircraft parts—all these vital war materials require engineering drawings.

Drawings require time.

They require too much time—when changes in designs and specifications must be incorporated into basic drawings and detailed drawings before new blueprints can be made and routed through a plant—and when 25 to 30 of such changes occur in a single day.

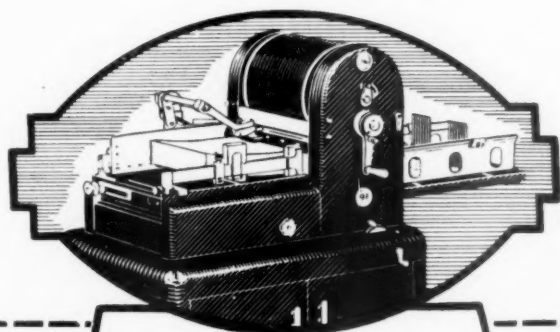
So executives of the aircraft division of a large rubber company turned to the Mimeograph duplicator. Engineers draw and letter their changes directly on a Mimeograph brand stencil sheet—place it on the Mimeograph duplicator—and pro-



GET 'EM FLYING FASTER—the Mimeograph duplicator helps keep this assembly line rolling at top speed.

duce copies for all factory divisions and subcontractors in a few minutes. These black-and-white Engineering Change Notices often take the place of a new blueprint . . . meet the "permanent file copy" requirement of the federal government.

This is just one example of the way Mimeograph equipment works for and with manufacturers to speed up war production. The Mimeograph distributor in your community knows many more to help your company save production time, help eliminate "bottlenecks." Call him for full information—or write A. B. DICK COMPANY, Chicago.



Mimeograph duplicator

MIMEOGRAPH is the trade-mark of A. B. Dick Company, Chicago, registered in the U. S. Patent Office.

A. B. DICK COMPANY, Dept. P-842, 720 W. Jackson Blvd., Chicago, Ill.
Send me full information on the Mimeograph duplicator.

NAME.....

TITLE.....

COMPANY.....

CITY.....STATE.....

When writing A. B. Dick Company please mention Purchasing

COLUMBIA nonstick PENCIL CARBON PAPERS

A BIG TIME-SAVER
IN BUSY BUSINESSES AND INDUSTRIES

Gives Sharp, Pencil-Written Copies —
Single or Multiple — of Diagrams,
Sketches, etc.

A new high in producing
bright, clean, colorful
CARBON COPIES
—IN QUANTITY

DOES NOT STICK,
SMEAR, SMUDGE
OR OFFSET

Ask your dealer for full particulars,
prices and free samples, or contact
the Columbia office nearest you.



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227 East Michigan Street, Milwaukee, Wis.
200 Plymouth Building, Minneapolis, Minn.
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—Also—
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"BRITENESS" MANIFOLD

—Surface-Sized—Stiff, Lies Flat—

Substance
7#, 8#, 9#, 10#

Sold by Leading
Paper Merchants

White and
Six Colors

Write for Samples and Prices

NORTH AMERICAN PULP & PAPER CORPORATION

200 Madison Avenue, New York City, N. Y.

Mill: Cheboygan, Michigan

**STAR
STAPLERS**

The best way to fasten
papers. Needed on every
desk. Use economical
standard size staples.
Built to last. Guaranteed
against defects.

STAR PAPER FASTENER CO., NORWALK, CONN.



Model S6
List Price
\$4.70

Purchasing Agents, Here's our offer:

... Write us a letter telling us where to send
it, and we will send you one of the latest
Model Star machines to try out. There's no
obligation and the transaction won't cost you a
cent!

Many other models to choose from.
Circulars and prices on request.

(Continued from page 138)

the bodies or containers of raw materials, work in process, parts to be assembled in the field, shipping containers which must be returned, sharp or otherwise dangerous articles, etc., is increasing. Stamps to fit and mark almost any shapes of surfaces can be had—the familiar "fresh egg" stamps are an example—and thus the surfaces or areas can be marked which are most likely to be seen, are in the best positions for reading, are least likely to be covered over in the process of product assembly or finishing, and are least exposed to being rubbed-off or blurred.

Modern rubber stamp inks can be had sunproof, weatherproof, waterproof, indelible, and highly resistant to rubbing, to be applied on steel, tin, varnish, wood, textiles, glass or almost any other material. A shop which uses many kinds of chemicals and many alloys of metals has for years used painted color codes to identify them and prevent errors in their use. The color codes are continued, but are supplemented by rubber stamping for sub-divisions of materials and for the help of new employees who may not have memorized the codes. Thus a chromium steel bar, identified by its painted yellow band, is stamped with its SAE number and its principal use—a foreman in the shop would notice instantly if a carbon steel bar were being used where a chromium alloy is needed, and he can check up quickly to make sure that the right alloy of chromium is being cut up.

In a shop where many complex operations are performed before the parts reach the assembly line, an individual color of rubber stamp ink is assigned to each department. When a work-progress or operations-list tag reaches any department, a quick glance shows whether or not the stack or tote box identified by that tag has been through the proper sequence of preceding departments. And a requisition calling for tools or materials not appropriate for a department is caught at once—the mixed requisitions which can result from careless or hasty use of department numbers are prevented.

With increased and widening use, more attention is being paid to the "copy" and the "format" of each rubber stamp. For the most discouraging rubber stamp problem is the tendency to make individual stamps too inclusive, too unbalanced and too hard to read. The modern tendency is toward parsimony of words, with simplicity and even beauty being desired. Many rubber stamp formats require the approval of advertising departments, public relations or industrial relations men before being accepted.

Since the starting point of the production of a rubber stamp is the setting of type like that used by printers, wide varieties of type faces may be had.

Like individual colors, individual
(Continued on page 142)

Gentlemen: It is interesting news that in your manufactory at South Windham you are now making the Fourdrinier paper machine, invented in France by Louis Robert and first successfully developed in Dartford, Kent, by the brothers Henry and Sealy Fourdrinier. We bespeak your success in this venture, for it is our feeling that the art of making paper by hand must eventually be linked to that of the machine if we would supply our expanding population with a sufficiency of paper of American manufacture.

Our mill here is undergoing a gradual transition in this respect. We have installed a cylinder machine and have in contemplation a dryer of like design. In time, no doubt, we shall give consideration to the installation of one of the machines you are making. However, it is my inclination to adapt mechanical means to our ways of making paper, rather than to change abruptly to conform to methods that are still in an experimental stage. This may appear to you to be a somewhat slow approach to progress, but I am one to hold fast to quality as the true test of manufacture, rather than to embrace volume as its measure.

Such was the standard we set for ourselves when we established this mill here thirty years ago, and we have adhered to it with the greatest fidelity, making our papers from cotton and linen fibers only, the sole materials from which enduring paper can be made. Such is our standard today, and it is the one I purpose to hand on to my sons, who are now learning how to make paper.

We shall welcome the first opportunity that presents itself to visit you and observe the workings of the new machine, holding as we do a receptive mind for all advances in mechanics that may be harmonized with individual skills and abilities.

With my respects, I am

Yours truly,
ZENAS CRANE

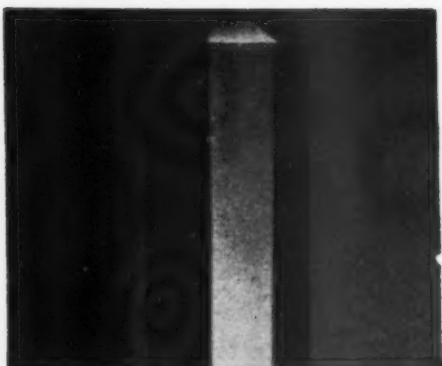
Dalton, Massachusetts
May 5, 1831

NOW — as then — Crane holds fast to quality as the true test of manufacture and, by modern methods and the accumulated experience and skill of five generations, converts cotton and linen fibers into enduring, distinctive papers for letters, documents of importance and record, and tokens of value such as the United States War Bonds you are buying in aid of your country and that all men may be free.



CRANE'S FINE PAPERS • MADE IN DALTON, MASSACHUSETTS • SINCE 1801

When writing Crane & Co. please mention Purchasing



Good Health Is Good Business!

AERO Paper Cups at every drinking fountain—protected in dust-tight steel or plastic dispensers—work for you daily by promoting better health and convenience. These crisp, clean cups are inexpensive—used *once* and discarded to cut down the spread of colds!

LOGAN DRINKING CUP CO., 68 Prescott Street, Worcester, Mass. • PACIFIC COAST ENVELOPE CO., 416 Second Street, San Francisco, California
U. S. ENVELOPE CO., Los Angeles Division, 2828 East Twelfth Street, Los Angeles, California.
Divisions of United States Envelope Company



Sample cups with full information sent on request. Address Dept. 8-P at the plant nearest you.

AERO CUPS

Any drinking fountain can easily be equipped so that AERO cups can be used.

(Continued from page 110)

type faces are assigned to departments or to functions—in one shop all stamps which are in any way used to promote **safety** are in a script type face which is used for no other purpose.

Type faces can be selected to contrast with the printed or typewritten lettering on forms—"open types" are used for this. Or on the other hand, rubber stamp type faces can match printed types, typewriter faces, and the like.

Where many words must be used, condensed faces—narrow from left to right but as tall as ordinary type—will save space. By using one condensed and one wide type face, a line containing few syllables can be balanced against one containing many, thus promoting attractiveness of format. Emphasis is obtained by setting one line in script, italic, heavy or open face; the remainder of the stamp being in Gothic. Borders, special initials or capitals, boxes for check marks, and all the other devices of the typographer are available. A distributor of office supplies found that when the rubber stamp formats were made more attractive, the employees tended to apply the stamps more neatly and with less banging and smearing.

Inks Are Important

Selection of inks can be important. A power transmission products maker changed to a quicker drying, less smearing ink, and noticed a speed-up in the application of tags in the shipping department. Special signature inks make rubber stamped signatures look like actual fountain pen writing—and cause the clerks who are authorized to affix the signatures of executives to be more careful about neatness of the appearances of form letters. Ink cans equipped with distributing devices lead to greater care in the inking of pads and to prevention of waste. Inks which penetrate more readily give better results on hard papers as well as on the leathers and woods for which they originally were developed. Ribbons in stamps, which supply the inks instead of using pads, add greatly to speeds in mailing departments and other places where stamping is so constant as to be a production operation. Self-inking stamps are preferred where desk surface is at enough of a premium so the stamp pad is a nuisance.

With the increasing amounts of paper work for tax forms, government reports and general control accounting, the highly adaptable features of "band" and other adjustable stamps are proving profitable. There are endless varieties of these—many specials being worked out for production departments and for payroll accounting. Some of these have fixed dies with adjustable bands for dates, identification numbers, and the like. In other cases

(Continued on page 144)

When writing advertisers please mention Purchasing

L. I. BROWN Bond Paper

MILLS AT ADAMS, MASS.

ESTABLISHED 1849

ADVANCE BOND*

100% New White Linen & Cotton Fibres

L. L. BROWN'S LINEN*

100% New White Linen & Cotton Fibres

FORWARD BOND

100% New Cotton Fibres

GREYLOCK BOND

75% New Cotton Fibres

ESCORT BOND

50% New Cotton Fibres



*Permanent grades

DON'T BE FORCED TO BORROW THE OTHER FELLOW'S COPY OF PURCHASING

The coupon below will
bring it to your desk
regularly every month.

PURCHASING

205 East 42nd Street, New York, N. Y.

You may send me **PURCHASING** for
One Year @ \$3.00. (Canada \$4.00.)

Name

Title

Company

Street

City State

Invoice to me ☐

Invoice Company ☐

"The National Magazine
for Purchasing Agents"

THE FACTS ABOUT *Wood* AS AN ALTERNATE FOR STEEL

YOU may now acquire Remington Rand record keeping equipment in wood as well as steel. To a limited extent, you still have a *choice*—depending upon your position as a producer of war materiel.

But *choice*, today, means something more than stating a preference. If you use steel when an alternate material will serve just as well, you're cheating a fighting man. If you *refuse* alternate products merely because you *prefer* steel, you are neglecting your responsibility to maintain record efficiency today—*when you need it most*.

Here, then, are the facts about Remington Rand's new wood alternate record keeping equipment—facts which may help you to better understand that "efficiency as usual" need not be sacrificed while steel goes to war.

NO PRIORITY NEEDED

Visible Records

KARDEX ADMINISTRATOR
KOLECT-A-MATIC ADMINISTRATOR
KARDEX TABLE STAND
SPEEDAC RACK
BOOK UNITS & CABINET

Vertical Records

GUARDSMAN FILING CABINETS
STEEL-SAVER TRANSFER CASE
LEDGER TRAY AND BASE

Office Furniture

DESKS, CHAIRS, TABLES

THE FACTS

CORRECTLY USED, the word *alternate* means *equivalent* when applied to Remington Rand's Administrator line of visible records and Guardsman line of wood filing cabinets. These quality products are not *substitutes*—are built for *permanent* rather than duration use.

WHEREVER PRACTICABLE, Remington Rand's wood equipment has been

designed to match existing installations of steel units. Thus, your present equipment can be added to without effacing uniform appearance or performance.

KARDEX ADMINISTRATOR cabinets, and Kolect-A-Matic Administrator wood items, are available in a wide variety of sizes—can be adapted to conform to any requirement. As always, you can custom build for your exact needs with *standard equipment*. There are no changes in control features—nothing is changed but the steel.

GUARDSMAN WOOD FILING CABINETS are available in two, three, four, and five drawer heights, with substitute drawers to accommodate 6x4 or 5x3 cards. A special 18-tray Tabulating Card Cabinet, and a six-drawer unit to house 8x5 cards, are being furnished—all as stock items.

ACCEPT THIS FREE OFFER

We have prepared two colorful new catalogs, complete with prices, illustrating and describing the full Remington Rand line of wood record equipment. One covers Vertical filing equipment—the other, Visible. You may have either or both of these free buyer's manuals merely for the asking. Write today to Remington Rand, Buffalo, New York,—or drop in at your local Remington Rand branch office. You'll receive your copies promptly. No obligation, of course.

WOOD EQUIPMENT BUILT FOR *Permanent* USE



ed to facilitate every factor in Punched-Card
ting routine, this tabulating card cabinet will
more than 70,000 cards complete with guides!
"drawer" is a tabulating-wise individual tray.

War-important Kardex, now in use by 80% of all Navy
"E" winners as a production control record, is avail-
able in wood without priority. Control features are
unaltered—nothing's changed but the steel.

The Guardsman File recently passed a gruelling run
of 300,000 effortless drawer actions by actual labora-
tory test! It's formed from wood and plastic with slide
suspension reinforced on moving parts with steel.

REMINGTON RAND INC.

"THE NAME" "ACE"



**On These STAPLING MACHINES:
ACELINER - SCOUT - PILOT
CADET - GLIDER - CLIPPER
MEANS**

***Guaranteed
LONG LIFE!***

Never before has quality meant so much to the consumer. When you purchased your Ace Stapling Machines — the Aceliner, Pilot, Cadet, Clipper, Glider, or Scout — maybe you didn't appreciate the full significance of the name "Ace". . . what it means during the present emergency when new supplies are so hard to get.

Today, the production of Ace Stapling Equipment is severely curtailed. In fact, the Government's rapidly expanding activities are absorbing the large part of those produced. But, if your office or factory is equipped with Ace Staplers, make them do double duty. You can give them the hardest kind of 24 hour service for, to our knowledge, no Ace Stapler ever built has worn out.

SOLD THRU DEALERS EXCLUSIVELY

**ACE FASTENER CORPORATION
3415 N. Ashland Ave., Chicago, Ill.**



(Continued on page 142)

individual bands have words on them, with other bands which may be adjusted for dates or numbers. An electrical products distributor has code words on one of these bands—the user of the stamp cannot make the error of substituting "pick" for "pack," etc., as sometimes happened when the code words were written in long hand, for only the correct code words appear on the stamp.

Adjustable stamps are in special sizes to fit ledgers, have "alphabet bands" so that whole words can be set up as needed, are equipped with automatic number changers so that a given number can only be stamped the correct number of times before the stamp resets itself to the next number in sequence, and in general are suitable to be selected as tools for handling paper work on a production basis.

Identification by Color

One shipping room manager found that his clerks continually got their stamps mixed up, borrowed them from each other, and in general got things "pied" so that they spent considerable time looking at the faces of stamps and searching for the right ones. The answer to this problem was found in plastic handled stamps—the plastics being in different colors and one color being reserved for each stamp face. With this system he could have spares of the faces most often used and every clerk always had at least one of these on hand; the less used ones could be "borrowed" from rack to rack as needed, and a single quick glance would identify any stamp. Speed was gained, and bickering among the clerks was reduced.

A study of stamp handles showed an office manager how to get better results. A long thin handle was found quicker to grab, but a short, wide handle induced more exact positioning of the stamped message and had more space for stamp identification lettering. Short round handles lessened the tendency to pound the stamp onto the paper—pounding needs a firm grip. He selected handles by stamp purposes accordingly.

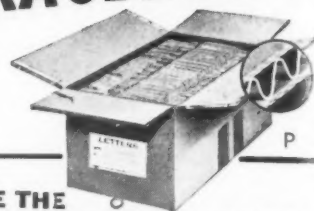
How to Buy

The specifying of rubber stamps needs care. Among the points desirable to cover are whether the stamp needs to be dust shielded or not, preferred means of identifying it—whether by handle colors or by pasted label or what; size, shape and color of handle; service to be performed; kind of inking desired—whether pad, self inking or ribbon; type face or style; outside dimensions of copy block; and exact wording and arrangement of copy.

The better stamp makers have consulting services which can guide in the selecting of rubber stamps. In many cases the simplest and most effective method of selection is to tell them exactly what the stamp is to accomplish and let them submit ideas and suggestions for approval.



STORAGE BOXES



PROVIDE THE MOST ECONOMICAL RECORD PROTECTION YOU CAN BUY

Conditions today make it imperative that you preserve all your vital records . . . and preserve them in such a way that you know that they are orderly and available at a moment's notice. Store all of them in Liberty Storage Boxes and you will be confident that they are well protected at a minimum expense.

You will see why Liberty Storage Boxes have maintained their superiority for 24 years when you examine the FREE sample we will send you.

FREE SAMPLE ANY SIZE

Attach this ad to your letterhead and mail to-day with 25c in stamps to cover shipping expense. State size wanted.

A SIZE FOR EVERY NEED

As much as 24 inches of filing space for as low as 88c.

BANKERS BOX COMPANY

536 South Clark Street • Chicago, Ill.

INSIST ON

**Parsons
Papers**

FOR YOUR

**Forms
Records
Stationery**

•
Superior Quality

MADE FROM COTTON FIBERS

•
Ask your Printer for Samples
of these fine grade Papers

•
PARSONS PAPER CO.
HOLYOKE • MASSACHUSETTS



SPRINGHILL TAG

FOR ECONOMY, SERVICE AND VALUE!

The sensational record made by Springhill White and Manila Tag — and Index — is no accident. Printers and production men who have jobs to prepare requiring an *all purpose* white board with toughness, strength and bright appearance have turned to **SPRINGHILL**, made from 100% virgin, bleached sulphate pulp, because its excellent printing surface, its low cost, combine to give maximum value. It is another International Paper Value! . . . doing its job in war production as well as serving civilian uses.

For more than 10 years, International Paper has advised buyers of printing to "Consult Your Printer"

INTERNATIONAL

PAPER COMPANY

220 EAST 42nd. STREET, NEW YORK, N.Y.

PAPERS *for* PRINTING *and* CONVERTING



THOUGHTFUL PLANNING IS A SERVICE TO THE NATION

When writing International Paper Company please mention Purchasing

Among the ASSOCIATIONS

RHODE ISLAND BUYERS HOLD SPECIAL MEETING

In view of rapidly changing conditions and important new developments, the Rhode Island Purchasing Agents Association held a special dinner meeting at the Wannamoisett Country Club, July 20th. George C. Vaughan, District Manager of Priorities in the Providence office of the War Production Board, led a discussion and answered questions on priorities and allocations.

1 1 1

BIRMINGHAM ASSOCIATION DISCUSSES INFLATION

Kingman Shelbourne, Director of the Birmingham headquarters of the Office of Price Administration, addressed a luncheon meeting of the Birmingham Purchasing Agents Association at the Redmont Hotel, July 16th. His topic was, "Price Ceilings or Inflation."

1 1 1

PORTLAND MEETING

The July 17th luncheon meeting of the Oregon Purchasing Agents Association, at the Mallory Hotel, Portland, was devoted to a general discussion of the latest releases from N.A.P.A. headquarters.

1 1 1

CLEVELAND P. A.'s PICNIC

The 25th annual picnic of the Cleveland Purchasing Agents Association was held at Nela Park on July 29th. High light of the sports program was a ball game between salesmen and Purchasing Agents. All during the afternoon there were games, contests, and swimming for adults and children. After an outdoor dinner, the evening was spent dancing. Chairman of the picnic committee was F. G. Allan, assisted by Barney Bergquist, Ora Young, Larry Curren and Larry Mayer.

1 1 1

TRI-STATE ASSOCIATION OFFICERS

The following officers have been chosen by the Tri-State Purchasing Agents Association, for 1942-1943:

President, Henry L. Ruf of Parkersburg Rig & Reel Co.

Vice President, R. C. Jarrell of Barium Reduction Co.

Secretary-Treasurer, Donald L. Boyd of Standard Printing & Publishing Co.

National Director, S. C. Wilhelm of Marietta Mfg. Co.

Directors, J. C. Shirley of Green Bag Cement Co.; T. O. Holland of Ames, Baldwin, Wyoming Co.; H. M. Begg of McBee Co.; A. A. Meyer of The West Virginia Rail Co.; and R. E. Wright of Standard Ultramarine Co.

BUFFALO ASSOCIATION

The annual picnic of the Buffalo Purchasing Agents Association was held August 5th at the Automobile Club of Buffalo, Clarence, N. Y. Chairman of the committee in charge was Harold Denecke of J. T. Ryerson & Son Co.

The complete list of officers elected for the coming year is as follows:

President, Raymond F. Holland of Buffalo Bolt Co. (North Tonawanda).

1st Vice President, George C. Kratzer of Houde Engineering Corp.

2nd Vice President, M. J. Corrigan of Mathieson Alkali Works (Niagara Falls).

Secretary-Treasurer, John C. Newton of G. L. F., Inc.

Directors (three year term), George C. Kratzer, George B. Michie of Electro Refractories & Alloys Corp. (Lackawanna), and C. Reid Collins of Worthington Pump & Machinery Corp.

Director (to fill unexpired term), Joseph J. Mayer of Lumen Bearing Co.

1 1 1

TOLEDO GOLF PARTY

The annual golf party of the Toledo Purchasing Agents Association was held July 16th at Heatherdowns. Gordon Yost was general chairman, assisted by C. E. Kuhlman, Cy Hawkins, and Fred Heidtman.

1 1 1

NEW ORLEANS ASSOCIATION

The Purchasing Agents Association of New Orleans enjoyed a "Breathing Spell" at Waldheim, the estate of Walter Jahneke, in the form of an all-day family outing July 19th. The program included boating, fishing, swimming, games and prizes, and welcome relief from the summer heat under the old oak trees of this splendid estate. Arrangements were in charge of the entertainment committee: Theo Harvey (Chairman), Charles Beck, Grant Clark, Walter Eagan, George Gabler, Fred Lind, Emile Morvant, James Nelson, Paul Olivier, John Peppard, Ed Schlesinger, and Frank Basile (Secretary). Regular monthly meetings will be resumed on September 14th.

1 1 1

SPRINGFIELD MEETING

The Springfield (Ohio) Purchasing Agents Association held a dinner meeting at the Shawnee Hotel, July 8th, with Eli Jensen, newly elected National Vice President for District No. 6, leading a report and discussion program reviewing the N.A.P.A. convention. The twice-a-month meeting schedule will be resumed in September.

AKRON FAMILY PICNIC

The annual family picnic of the Akron Purchasing Agents Association was held at Mingo Camp in the Akron Metropolitan Park, on August 1st. It was an old fashioned basket picnic with a program of sports, contests and a ball game for the grown-ups and all the extras for the youngsters. The committee in charge consisted of T. L. Cook (Chairman), M. B. Cowling, F. J. Kark, and F. W. Miller.

1 1 1

NORTHWESTERN PENNSYLVANIA BUYERS DISCUSS PRIORITIES REGULATIONS

The newly elected officers of the Purchasing Agents Association of Northwestern Pennsylvania took charge of the July 9th meeting, at the Allegheny Hotel, Oil City. The program was devoted to a discussion of priorities regulations, led by P. L. Gedeon of the Cyclops Steel Co., "Priorities Regulation No. 10"; D. F. Manion, Jr., of the Manion Steel Barrel Co., "Priorities Regulation No. 11"; and L. R. Forker of Quaker State Oil Refining Co., "Priorities Regulation No. 3." The Association will hold its August meeting at Warren, Pa.

1 1 1

BIRMINGHAM MEETING

A. W. Vogtle, Vice President and Manager of Sales and Traffic for the DeBardeleben Coal Corp., addressed Purchasing Agents Association of Birmingham at a luncheon meeting July 23rd. His topic was: "Regulation of the Coal Industry."

1 1 1

BUYERS ADDRESS PURCHASING CLASS AT STANFORD

The course in industrial purchasing at the Stanford University Graduate School of Business has been definitely keyed to the war training program, emphasizing the part which purchasing must contribute on the industrial front. Martin H. Gerry III, Purchasing Agent for the University, is again in charge of the course. Several members of the Northern California Association have assisted by lecturing on special phases of buying. Those participating in this work include:

Ralph Jacobson of Rotometals, Inc., "Purchasing Organization and Procedure."

William C. Hubner, City and County of San Francisco, "The Place of Purchasing in Business; Relation of the Purchasing Department to Other Departments of an Organization."

Louis A. Colton of Zellerbach Paper



WOOD

A NAME WHICH MEANS "LEADERSHIP THROUGH SPECIALIZATION"



WOOD . . . is producing more and more . . . to win the war more quickly.

Illustrated: "Big Fist" Brand Scoop . . . with Steel I-Beam Handle Reinforcement.

PRODUCT leadership springs from specialization. It comes from the devoted labor of heads and hands uniting in the day by day production of one product . . . always endeavoring to make that product better and better . . . always insisting that each upward step in quality be maintained in each tool produced. Specialization, such as this, leads constantly to those new ideas which make a product more durable, more efficient, and more useful.

The Wood Shovel and Tool Company has specialized not only in the manufacture of shovels, spades and scoops but also in the creation of improvements in their design and workmanship. New features in these products, first originated and introduced by Wood, have formed milestones in the full modernization of man's most ancient tool of useful labor.

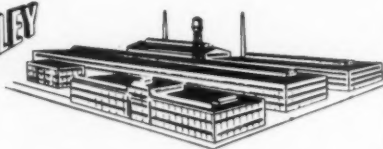
THE WOOD SHOVEL AND TOOL COMPANY
PIQUA, OHIO

A NATIONAL ORGANIZATION SPECIALIZING EXCLUSIVELY IN SHOVELS, SPADES AND SCOOPS

When writing The Wood Shovel and Tool Company please mention Purchasing

RIGHT DOWN OUR PRODUCTION ALLEY

We want WAR SUB-CONTRACT work!



We need work — you need help — let's get together.

Stewart has enormous manufacturing and ample shipping facilities for production runs of units or parts of units fabricated from angles, flats, tees, rounds, squares, sheets, strips, and plates involving the use of equipment listed at the right.

Stewart offers competent engineering service; on time deliveries; best workmanship and the highest financial rating obtainable. When writing, please send specifications and complete information.

Stewart
FABRICATORS OF
IRON • STEEL • WIRE
ANGLES • PLATS • ROUNDS • SQUARES • TEES • STRIPS • SHEETS • PLATES

PRODUCTION FACILITIES

Punch Presses • Shears
Power Brakes • Spot,
Arc and Gas Welders
Drill Presses • Bull
Dozer Forming Equipment
Automatic Saws • Heat
Treating Furnaces • Fin-
ishing Equipment • Tool
Room Equipment.

**THE STEWART
IRON WORKS CO. Inc.**
1961 STEWART BLOCK
CINCINNATI, OHIO



DIFFERENT, SPECIALLY
DESIGNED, HIGH QUALITY
OAKITE MATERIALS
to help you in
PRODUCTION,
MAINTENANCE AND
SANITATION CLEANING

Plant SANITATION and MAINTENANCE Made Easier for You!

If your factory or mill personnel has greatly increased in numbers, your SANITATION and MAINTENANCE problems and requirements have MULTIPLIED in proportion.

Our wide, successful experience in war plants in every industry . . . helping them maintain sanitary standards easier . . . particularly where large numbers of women workers are employed, is yours for the asking!

FREE DIGEST TELLS STORY

Various specially designed Oakite materials for low cost plant maintenance and sanitation are described in FREE, 28 page Digest. Your copy is ready . . . Send for it today. No obligation.

OAKITE PRODUCTS, INC.
54 Thames Street, NEW YORK, N. Y.
Representatives in All Principal Cities of the
United States and Canada

OAKITE
Specialized
CLEANING
MATERIALS...METHODS...SERVICE

When writing advertisers please mention Purchasing

PURCHASING

Co., "What the Purchasing Agent Should Know About Paper."

Fred Misphey, State Purchasing Agent, "Governmental Purchasing for a Great State."

1 1 1

Philip F. Smith, secretary of The Osborn Manufacturing Co. of Cleveland, has accepted an appointment as a senior priority specialist in the Special Industrial Machinery Branch of the War Production Board for the duration of the war.

Smith is one of three sons of Franklin G. Smith, president of Osborn, and has served the firm as salesman, advertising manager and factory manager.

1 1 1

Ray Neal, president of the R. C. Neal Company, Buffalo, has been invited to become Senior Consultant in the Distributor Branch of WPB, a post recently vacated by Russ Duncan, who has accepted a position in the Inventory Control Branch.

1 1 1

Russ Duncan, president of the R. C. Duncan Company, Minneapolis, has been appointed Chief of the Field Section of the Inventory Control Branch of WPB. Ray Neal has taken his place as the Senior Consultant in the Distributor Branch of WPB.

Eliminates Extra Handling

With an inexpensive Fairbanks skid platform at production points, things can be loaded as finished. When filled, hook on the Jack and wheel the load to the next point. One Jack handles many skid platforms.

Saves the expense of piling and re-piling, loading and unloading.

Fairbanks Lift - Jack Truck is low-priced, yet has the advantages of high-priced types. Write for Catalog J-1.

THE FAIRBANKS CO.
22 East 4th St., New York, N. Y.
Boston, Mass. Pittsburgh, Pa.
Distributors in Principal Cities



Fairbanks
LIFT-JACK TRUCKS

GOVERNMENT WILL PURCHASE INACTIVE COPPER STOCKS

Three hundred thousand tons of copper and brass products, saved for military uses by limitation and conservation orders of the WPB, will soon be on their way to munitions factories for conversion into implements of war. Metal once intended for ash trays, door knobs and roofing will go into rifle cartridges and artillery shells and the engines and motors of fighting ships and airplanes.

It is estimated that the 300,000 tons of metal will yield 255,000 tons of copper and approximately 45,000 tons of zinc. This is enough copper for the production of three and one-half billion rounds of armor-piercing .30 caliber rifle or machine gun ammunition, two million 75 mm. field howitzer shell casings, 33 destroyers, 28 cruisers and 2000 bombers.

Some 20,000 copper fabricators have received notification from the Inventory and Requisitioning Branch of WPB of the method by which the Government will buy their inactive stocks of primary and fabricated copper. Eighty thousand other owners of copper inventories will receive similar notices in the near future.

Scarcity of copper for military and essential civilian uses has been the source of serious difficulties for nearly a year. Since the attack upon Pearl Harbor threw the nation's armament program into high gear, the current available output of the metal is considerably less than the expanded munitions indus-



LOWELL SAFETY-STEEL WRENCH

THE
SAFE AND SURE
REVERSIBLE
RATCHET THAT
WILL SAVE
TIME AND
MONEY

A New Handle for
any broken one
returned

MANUFACTURED BY
LOWELL WRENCH COMPANY
Worcester, Mass., U. S. A.

SAFETY

(Reg. Trade Mark)

WEDGE GRIP RADIUS HOLDER



For marking around circumference of shell forgings, bars, tubes, and other round pieces. Adjustable for stamping on different size radii.

Safety Steel construction eliminates spalling and mushrooming.

Write for circular

M. E. CUNNINGHAM CO.
154 E. Carson St. Pittsburgh, Pa.



Quick-Fitting **TRIPLEX**
Threaded Fasteners Help
Your Plant Help To **WIN the WAR**

Speed your assemblies with accurately formed Triplex Cap Screws, Bolts and Nuts that fit and tighten cleanly, quickly, avoiding delays caused by misfits. Write today for new information on deliveries — some items ready for immediate shipment. *The Triplex Screw Co., Box 1768, Neuburgh Station, Cleveland, Ohio.*

TRIPLEX CAP AND SET SCREWS • BOLTS • NUTS AND RIVETS
MILLIONS IN USE • EVERYWHERE



Help us help Uncle Sam

Witt Cans—already the longest lasting containers obtainable—can be made to give even longer service by observance of a few simple rules.

Help us keep Uncle Sam supplied with plenty of WITT CANS. Take better care of your own.

CARE OF CANS

Paint cans inside with asphaltum paint.

Paint name or symbol on cans and lids—prevents loss or theft of cans, and helps to identify them.

Never sprinkle or wet ashes before putting them in cans. Ashes contain sulphur and when wet, a mild sulphuric acid is formed.

The WITT Cornice Co.



WINCHELL AVE.

CINCINNATI, OHIO

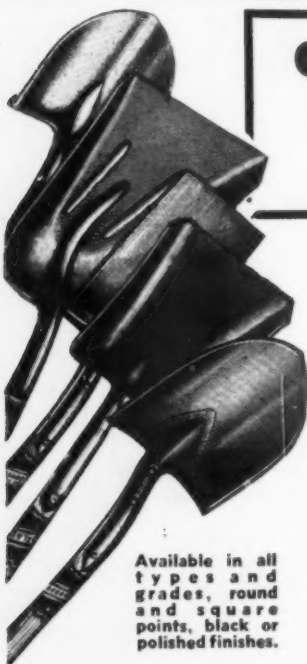
try requires to operate at one hundred per cent capacity.

Prices at which the Government will buy copper inventories range from 15 cents a pound for certain types of drawn copper wire to 30 cents a pound for copper in certain other forms. Representatives of industry and Government officials worked out a carefully determined price schedule. Consideration was given to providing a fair and reasonable return to owners who have copper which they cannot use because of war-time restrictions, and which the Government must acquire, and in most cases re-process, for military purposes. Fabricated copper products will be purchased at prices up to two and one half times their value as scrap.

Accompanying WPB's price schedule is a set of forms on which manufacturers will report the precise nature of the copper and copper-base alloys in their inventories and indicate their willingness to sell them to the Government.

When the completed reports and replies to the Government's offer to buy are received by WPB, they will be reviewed to determine the most efficient and economical disposition of the material for immediate war use.

It is expected that the working force required by the WPB and the Copper Recovery Corporation to conduct this vast operation will number between three and five hundred persons, and that eight months to a year will elapse before the last of the salvaged copper reaches its destination.



Available in all types and grades, round and square points, black or polished finishes.

GET THIS... EXTRA VALUE in SHOVELS!

The Blade Edges
are GUARANTEED
SPLIT-PROOF!

The Steel for Ingersoll Shovel Blades is produced in our own steel mills by a cross-rolling Process. It is called TEM-CROSS Tillage Steel, and is the same as is supplied by us to America's leading Implement Manufacturers. Cross-rolling gives an interlocking, mesh-grain structure which resists splitting. Get this extra value in every Shovel you buy.

Write for Catalog and Prices.
Address New Castle Plant. Dept. P.

INGERSOLL STEEL & DISC DIVISION

Borg-Warner Corporation
New Castle, Indiana

Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.

INGERSOLL SHOVELS

"The Borg-Warner Line"

Keep Ahead with

**DARNELL CASTERS
& E-Z ROLL WHEELS**



DARNELL CORP. LTD., 60 WALKER ST., NEW YORK, N.Y.
LONG BEACH, CALIFORNIA, 36 N. CLINTON, CHICAGO, ILL.

GOOD NEWS ★ ★ ★ ★ ★ ★ ★

Fortunately we did not wait until present peak demands forced us to increase production. In '39 we completed a four-year plan of improvement, expansion and modernization. Since then these new facilities have been still further expanded to give you the best source for Cap Screws, Set Screws, and special upset parts.

12-C

THE CLEVELAND PLAIN DEALER, SUNDAY, OCTOBER 22, 1939

SCREW PLANT HERE SPENDS \$250,000

Cleveland Cap Adds Latest Machinery; Runs at Capacity Without War Orders

BY GUY T. ROCKWELL
Financial Editor

Booked to capacity for the rest of the year at least, the Cleveland Cap Screw Co., 2917 E. 79th Street, has just completed a quarter million dollar expansion program that places it in excellent position to meet the current upsurge in business.

Within the past eighteen months, President J. W. Fribley explained yesterday, the Cleveland Cap Screw Co. has increased its plant about 25 per cent, and installed some of the most modern machinery in the industry for turning out cap and set screws. Equipment includes a large machine made by the National Machinery Co. of Tiffin, manufacturer of the "Boltmaker" that produces cap and set screws up to one inch in diameter and six inches long at the rate of 50 a minute and 80 a minute of smaller sizes.

Cleveland Cap Screw officers report that so far as they know they have no war orders in their plant. They have some export business but the great bulk of their shipments will be for domestic consumption.

The present heavy buying for railroad of new rolling stock and repairing of cars and locomotives is creating a harvest for the makers of bolts and a substantial amount of orders now in the Cleveland Cap Screw Co. are from railroad companies throughout the nation.

Cleveland Center of Cap, Set Screw Industry

Cleveland is known as the center of the cap and set screw industry. There are fourteen plants in the city engaged in making the useful little pieces of steel so essential in the automotive, railroad, farm equipment, tractor, truck, machine tool and many other fields.

The washing machine and refrigerator in the home contain many of these parts. Even the machine that presses your clothes probably could not be put together so easily without cap and set screws.

President Fribley says his plant is running full in common with that of the industry.

Remarks by Wm. G. Grier, Attest

Two statements by leaders in the steel industry diametrically opposite, uttered last week, may be taken as a fair indication of the general feeling of uncertainty among business men.

Ernest T. Weir, head of the American Iron and Steel Institute, said the "present business boom was unground because it rested on a foundation as firm as the filling of a cream puff."

The same day Tom M. Grier, chairman Republic Steel Corp. remarked that he expected business improvement to continue indefinitely, adding that "it will hold up unless there is peace and there is little chance of peace."

Orders Shipped to Some Lines

Business continues to high rate but in some lines found that orders are coming in some orders have been placed two weeks.

Business continues to high rate but in some lines found that orders are coming in some orders have been placed two weeks.

Business continues to high rate but in some lines found that orders are coming in some orders have been placed two weeks.

STOCKS POINT UP, QUOTATIONS OF NEW YORK STOCK TRUCKS LEAD RISE

War-Time Whirl Closes Week on Exchange

BY FREDERICK GARDNER

NEW YORK, Oct. 21 (AP)—Selective strength, with a war-time lunge, returned to the stock market today and enabled the list to emerge from the week with prices generally pointing upward.

Motor trucks, lately quiet performers, came to life and led the recovery with gains of 1 or more than 2 points. There were one or two wider advances elsewhere. Aside from the favorites, though, improvement was mainly in fractions.

The list got off to a quiet start, but volume broadened in later dealings. While the most popular stocks finished at the day's top, many issues closed somewhat under the peak.

Sterile, aircraft and specialties participated to a degree in the upturn. Utilities, oil and rail recorded modest plus signs.

The truck department apparently was buoyed by word the French had placed orders for some 2,000 heavy vehicles in this country and were ready to take on as many more as soon as the manufacturers could supply them.

News from abroad, according to the "war to a finish" theme, seemed to inspire some traders who have been hanging back recently, but said, although others still hesitated, they desired more confidence that the overseas front was not a protracted peace drive. Disarmament abroad, in fact, optional segment.

Developments in the currency market, the result of the battle between the dollar and the pound, seemed to have little effect on the stock market.

After building six machines, Oppenheimer died of typhoid fever. His wife was determined to see her husband's work carried on and she with her eldest son and Synek continued the business. Later other sons entered the business and the company has continued to grow.

With a net worth in 1900, \$3,000, New Idea has increased to \$4,013,552 this year.

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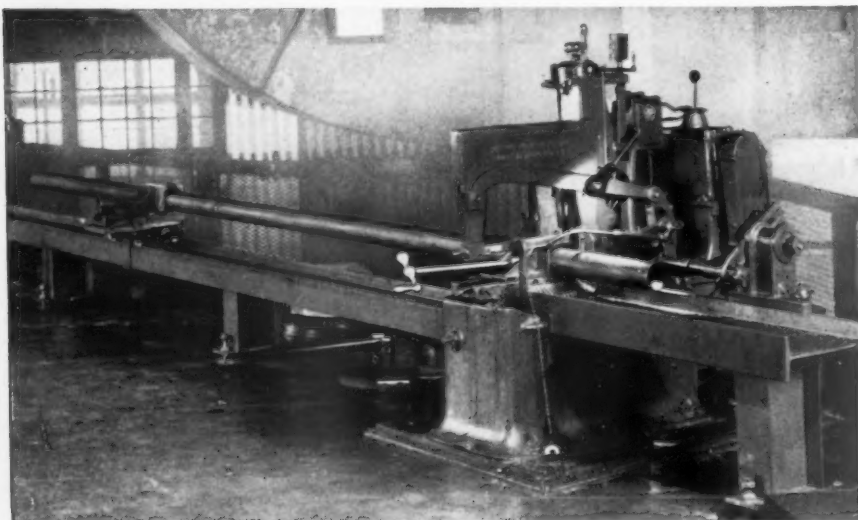

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For fast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin No. 600.

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"The Hack Saw People"

5700 Bloomingdale Ave.

Eastern Sales Office: 225 Lafayette St., New York

Chicago, U. S. A.

will be made by the Copper Recovery Corporation, a non-profit organization formed to act as agent for the Metals Reserve Company, a subsidiary of RFC. The costs of the program will be paid out of a fund set up by RFC to cover a number of such commodity salvage programs.

In cases of refusal to accept the established prices, the WPB will probably requisition such copper and copper-base alloys as it must obtain for the war effort.

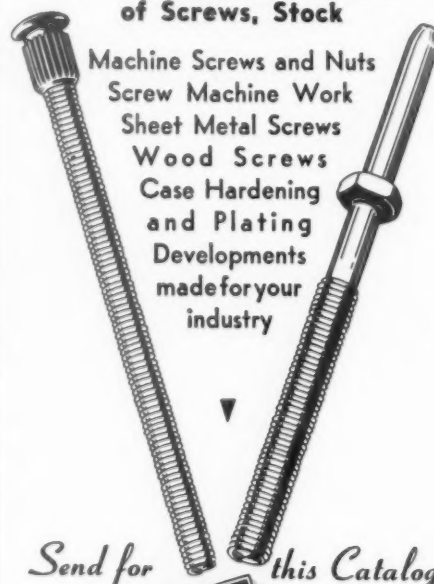
It is believed that substantial quantities of partially and wholly assembled copper products may be used in their present form, and it is urged that manufacturers working on war orders notify WPB, in care of the Copper Recovery Corp., 155 East 44th St., New York City, of particular needs which they are experiencing difficulty in filling. In such cases, WPB will endeavor to bring together potential buyers and sellers without involving the government in purchase of the material. Metal which must be reprocessed before it can be used for war purposes will be sold by the government to brass millers, refiners and ingot makers, at the ceiling prices set by OPA.

WPB officials point out that the campaign thus launched represents an opportunity for industry cooperation in a program of the utmost importance to the conduct of the war. Complete and accurate reports of inventories, and their prompt filing, will mean accelerated pro-

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Machine Screws and Nuts
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INCORPORATED 1892

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Honor to you men who wait so that America and her ships can have valves some of you need so desperately.

* * *

*"TO AMERICAN SHIPS! MAY GREAT FLEETS OF THEM
SAIL FORTH—TO RETURN, SOON, WITH PEACE."*

We can drink that toast together for we sweat with you. Scarcely had READING-PRATT & CADY completed tremendous additions to capacity—to meet the greater demands you were making for READING-PRATT & CADY VALVES—than came Pearl Harbor. Immediately following, we heard the call for more ships than the world had dreamed possible to build. Every ship is a maze of valves. And we were asked to take the responsibility for many of them.



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War contracts bring involved sets of specifications. Maybe you have never had to consider a paper component in your peacetime product. But maybe today it's a different story. If so, turn for help to Dennison. For in addition to making its familiar tags and labels, Dennison has facilities for working paper into an infinite variety of articles. Here are examples:

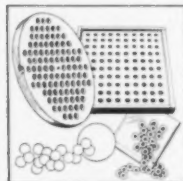


FLARE PARACHUTE PARTS. Parachutes for flare shells are machine sewn from special para-flare tissue paper. Spacer and pilot discs keep cords of another type of parachute from

tangling. These are of heavy binders board, punched, and in the case of the larger disc, are brass eyeleted and then paraffined.

BOMB & MINE TAGS.

The round instruction tags for bombs and mines are metal rimmed for extra strength. One has a metal ring fastening device. Oblong tag carries cotter pin strung through a reinforcing metal eyelet. These are modifications of Dennison stock tags.



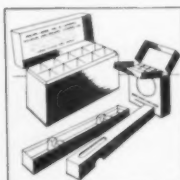
SHELL ASSEMBLY

PARTS. Round detonator tray is constructed of cardboard discs, square one is varnished wood. Fuze parts, primer discs, washers and powder separators

are made from such stocks as felt, onion-skin, foil, newsboard, cork. Processes include laminating, perforating and diecutting.

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If you have a paper-converting problem write Dennison today.

Dennison
DEPT. 79 WAR PRODUCTS DIVISION
Framingham Massachusetts

N. Y. PURCHASING DEPARTMENT SETS UP ALLOCATION SYSTEM

Meeting the critical situation of the day in respect to materials and their use, an important revision has been made in the regulations of the New York City Board of Estimate, which in effect sets up a priorities and allocation system modelled upon the national organization and adapted to local application in respect to municipal purchases. The Commissioner of Purchase, besides being named as a member of the City Priorities and Allocations Board, occupies a key position in the determination of policies and in administering the city's consumption of materials on a planned requirements basis. The system is defined in the following new section adopted by resolution of the Board of Estimate on June 25 and incorporated in the rules and regulations of the Board relating to the execution and performance of contracts by the City.

Section Sixteen

(a) The term "materials" as used in this rule includes supplies, materials and equipment as classified in the manual of expense accounts established by the Comptroller.

(b) All requests for approval of contracts involving the use or acquisition of materials, or for construction or repair, or for final authorization of assessable improvements which, under the present

procedure, are submitted to the Board of Estimate, shall instead be submitted to the Budget Director, or in the case of requests for final authorization of assessable improvements to the Chief Engineer of the Board of Estimate.

(c) The Budget Director and the Chief Engineer, within their respective jurisdictions, shall examine such requests and if they are prepared to report favorably thereon to the Board of Estimate they shall then determine, with such aid and assistance from other departments of the City as shall be necessary, whether the contract involves the use of materials under priority or other federal regulations or whether it requires federal approval. If the request is found not to involve such materials or federal approval, then the request and the favorable report shall be transmitted to the Board of Estimate for its action, except that if the request came from a department under the Mayor's control, it shall instead be submitted to the Mayor for his approval before transmission to the Board of Estimate.

(d) If the Budget Director or the Chief Engineer is prepared to report favorably upon such a request, but it shall be determined that the contract is one involving materials under priority or other federal regulations or requiring federal approval, then the request and



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No more will designers and engineers, who replace weighty—corrosive—costly—hard-to-get materials with engineered CONTINENTAL-DIAMOND NON-metallics, want to go back to the materials replaced.

C-D NON-metallics are not substitutes.

They should and can achieve BETTERMENT of product, process or performance. C-D NON-metallics are better

suited to meet many of the material problems of either a war or peace economy than are many habitually used . . . now hard-to-get . . . materials.

C-D NON-metallics offer unique characteristic combinations. For example, DILECTO, one of five C-D NON-metallics, combines high Dielectric Strength, Corrosion Resistance, Light Weight (Specific Gravity 1.36), Resiliency, Moisture Resistance and Adaptability for High Speed, Accurate Fabrication on standard metal-working machinery. The other four C-D NON-metallics offer equally advantageous characteristic combinations.

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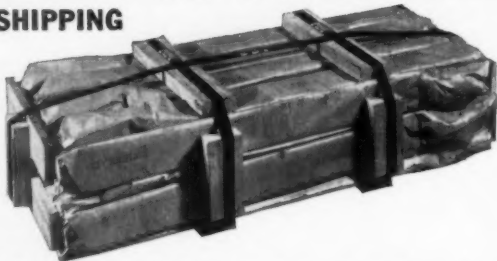


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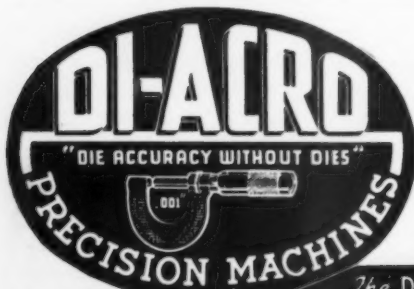
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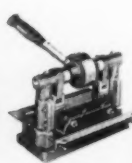
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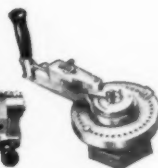
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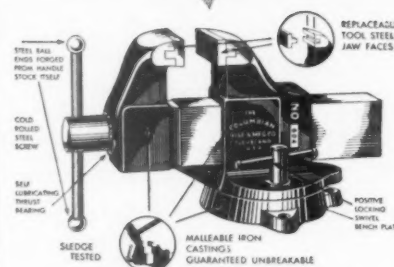


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the certificate of the Budget Director may be issued.

(g) If the Budget Director or the Chief Engineer, within their respective jurisdictions, shall determine not to report favorably upon the request, or if federal approval shall be finally denied, then the request shall be returned to the department.

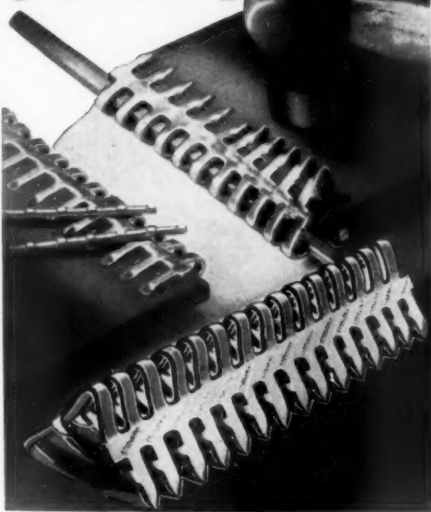
Part 2—City Priorities and Allocations Board

(h) There is hereby established a City Priorities and Allocations Board to consist of the Director of the Budget, the Commissioners of Purchase and Public Works, one Borough President to be chosen by the five Borough Presidents, and the Comptroller as Chairman.

(i) Such Board shall have such staff as shall be approved by the Budget Director, and any employee may be assigned or transferred temporarily to such staff by certificate of the Budget Director, on the agreement of the head of the agency in which the employee now works, or failing such agreement by action of the Board of Estimate.

Such Board shall make such rules and regulations, and interpretations thereof, as it may find necessary or convenient for the exercise of its jurisdiction, which shall be in writing and shall be subject to change. Such rules and regulations may delegate to its staff or to members thereof the performance of such part of its duties and the exercise of such

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part of its powers as it may find convenient and advisable.

(j) The Department of Purchase shall establish one or more lists of critical materials, the available supply of which is so limited that it is doubtful whether the City can secure sufficient amounts thereof to meet normal City consumption, or which are subject to federal restrictions as to acquisition, possession or use, and may from time to time revise such lists.

(k) The City Priorities and Allocations Board shall have the power:

(1) to make or require inventories of materials in the possession of the various agencies to such extent as it shall deem advisable.

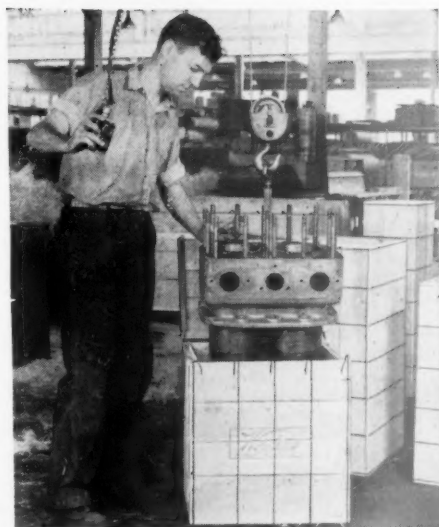
(2) to regulate the use of any material on any critical list, or to prohibit its use except with its certificate of approval.

(3) to ration the use of critical materials by the various agencies or to allocate the available supply among them.

(4) to transfer critical materials from one agency to another with the consent of the department possessing such materials, or failing its consent to refer such transfer to the Board of Estimate for its action. The City Priorities and Allocations Board may establish rules and regulations for crediting and debiting accounts in connection with such transfers.

(5) to approve in whole or in part or to disapprove requests submitted under paragraph (1) below.

Before taking action in respect to materials required or useful for medical



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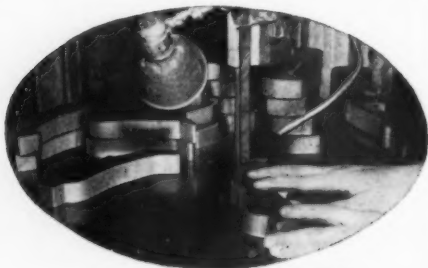


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purposes such Board shall consult with the Commissioner of Hospitals.

(1) All expenditures of monies or withdrawals of stores chargeable to codes for supplies, materials or equipment, in the expense budget or elsewhere, and all expenditures for construction or repairs in amounts less than \$1,000 involving materials on the critical lists or subject to priority or other federal regulations, or otherwise requiring federal approval, shall be subject to the jurisdiction of the City Priorities and Allocations Board and shall be made only as prescribed in its rules and regulations.

(m) This rule shall become effective immediately, but the provisions of paragraphs (k) and (1) shall be suspended until the City Priorities and Allocations Board shall establish the necessary rules and regulations for the effectuation of its powers under such paragraphs, which date shall be determined by the issuance of notice thereof to the various City agencies.

NATIONAL POWER RECOVERY PLAN

Introduced at a luncheon for industrial periodical editors in New York City, the National Power Recovery Plan, sponsored by John S. Krauss, President, L. H. Gilmer Company, Philadelphia, Pa., is a recent contribution to the conservation of critical material. The plan includes a number of survey sheets designed to aid industrial users in survey-

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TO help you get delivery *now* on essential steel fasteners, Oliver engineers are concentrating on methods of speeding production of special-purpose fasteners. Often, some slight change of design which does not affect the use of the bolt, will speed production by weeks and substantially lower your costs. Or perhaps the adaptation of one of our many standard bolts in place of these specials would not affect the application and might smash a serious production bottleneck in your plant. All special fastener inquiries are reviewed by Oliver engineers. Where alteration of your design would speed delivery, we offer our suggestions to you. These methods are *assuring quick delivery* to many contractors and sub-contractors who must not be delayed. This service is designed to speed your war production and Victory! Let Oliver help you with your steel fastener problems today!



This is a special purpose bolt that is difficult to produce quickly . . .



A slight design change speeded delivery, lowered cost, equaled utility.

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BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

ing electricity, steam, mechanical power, compressed air and water, refrigeration and boiler room activities to determine recommended practices for correction of power losses and estimated costs of the new installation. A two color brochure, outlining the power conservation plan, has been prepared by the L. H. Gilmer Company and is being distributed to industrial executives throughout all industries essential to war efforts.

The brochure includes a post card addressed to Mr. George T. Weymouth, Chief, Industrial Salvage Section, Bureau of Industrial Conservation, Washington, D. C., which will permit individual industrial users to notify the War Production Board that they are placing the Gilmer National Power Recovery Plan into operation in their plants.

STANDARDIZATION FACILITATES STEEL PRODUCTION

The American Iron & Steel Institute reports that standardization has been of material aid in facilitating the production of steel for war equipment. Up to two years ago, carbon and alloy steels were made in more than 4,000 different combinations of chemical elements. As a result of studies and research by leading steel plant operating executives and metallurgists, working through the Institute, a group of 87 alloy steels and 77 carbon steels have been selected as adaptable to most industrial requirements, and emphasis has been placed on the specification and use of these as standards. The effectiveness of this campaign is reflected in 1941 production reports, which show that these groups of standard steels accounted for 90% of the total output of carbon steel, 70% of alloy steels made in open hearth furnaces, 85% of electric furnace alloy steels, and 100% of the stainless steels.

TESTING FACILITIES ARE LISTED

In recognition of the desirability under present conditions of independent commercial testing service and in anticipation of a marked demand for such service, the National Bureau of Standards has just released a Directory of Commercial Testing and College Research Laboratories.

The directory contains the names of 244 commercial laboratories, with 71 branch laboratories or offices, together with the addresses and a brief outline of the type of commodities or products tested. It also lists the laboratories of 199 colleges which are used not only for purposes of instruction but also to a considerable extent for research.

In accordance with the law the Bureau of Standards makes tests and carries out investigations for other Government agencies. It does not make tests for private individuals if other laboratories can do the work with sufficient accuracy. The Bureau's facilities now are almost wholly given over to projects directly related to the war effort.

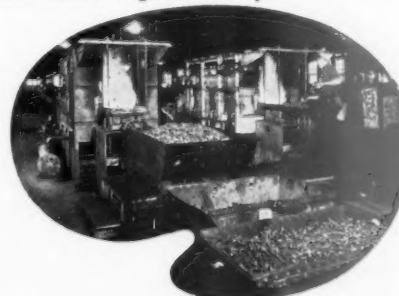
It is believed that the existence of a thoroughly classified list of commercial testing laboratories will have a number of beneficial effects in promoting the use



HERE'S an **EXAMPLE!**



GEORGE HAISS Manufacturing Company, a manufacturer of clamshell buckets whose equipment even now is clearing new air fields for America's wings, found that the teeth bolted to the body of the bucket were shearing off in heavy duty service. Oliver engineers were called in to solve this problem and recommended a change in the steel and heat treatment. Result, no more trouble . . . *prompt delivery* because a standard manufacturing process with only a special heat-treatment was employed. Why not discuss *your* steel fastening problem with Oliver engineers today?



Few manufacturers are as well equipped as Oliver to supply high tensile, heat treated bolts for heavy duty service.


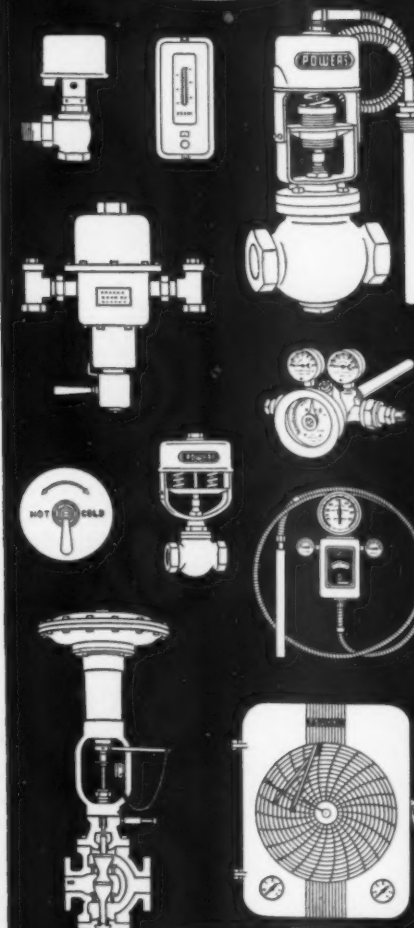
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of specifications, not the least important of which will be the inducement offered to the large number of purchasers who have hitherto hesitated to buy on specifications. Many such purchasers are not individually equipped to make their own acceptance tests. The knowledge that they can at any time call upon testing laboratories to check deliveries is expected to encourage many such purchasers to take full advantage of the specification method of purchasing.

Large numbers of manufacturers, in order to overcome the disadvantage which many purchasers have in comparing commodities purchased with specification requirements, have indicated their willingness to give written certification that their products meet specification requirements. In fact, the Bureau of Standards has compiled more than 860 different lists of manufacturers who are prepared to stand behind their products in this manner. These lists now contain more than 23,000 names.

The new directory is known as Miscellaneous Publications M171, and copies may be obtained from the Superintendent of Documents, Washington, D. C., at 15 cents per copy.

RUBBER BELT SALVAGED

An interesting case of belt salvage, and resultant conservation of rubber is reported by The B. F. Goodrich Company, Akron, Ohio. A paper mill customer badly needed a 20-inch six-ply belt 42 feet long.

On a drive which was no longer used they had a 32-inch eight-ply belt, on which the top and bottom plies had been worn and cracked through wear and age. Using the field splicing and repairing technique which has been part of The B. F. Goodrich program for many years, the distributor's salesman stripped off the top and bottom plies of the 32-inch belt, slit it into 20-inch and 12-inch

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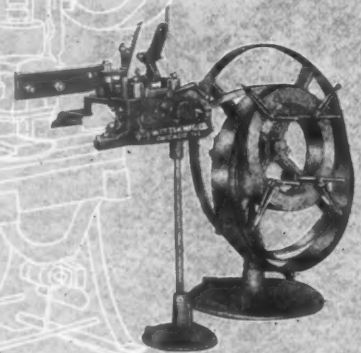
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In the all-out war production of Wittek Hose Clamps for aircraft, tanks, jeeps, trucks, and engines, the making of stampings from coiled strip stock is a major operation.

To attain this mass production schedule, speed, accuracy and efficiency in feeding the metal to punch presses were essential. Wittek pioneered and developed the Wittek Automatic Roll Feed for that purpose. It has been proven on Wittek's and many other production lines, as the most important contributing factor for maintaining those present high production levels. Wittek Automatic Roll Feeds and Reel Stands are made available to other manufacturers who fabricate parts from coiled stock and demand speed and efficiency in their punch press operation. Write for catalog, prices and specifications.



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Causes of Hack Saw Troubles

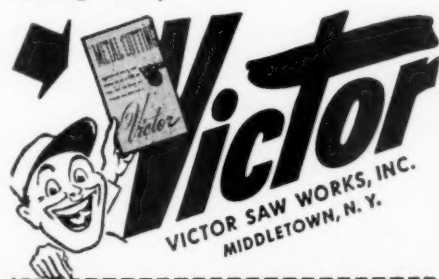
STRIPPED TEETH: Too coarse a tooth on thin-walled section; too fine a blade used on soft stock; blade started at wrong angle; too much pressure.

BROKEN BLADE: Insufficient tension, allowing blade to twist and buckle; new blade in old cut; too much tension on blade (if blade breaks at end holes only); too coarse a blade for hard stock; wrong angle of blade or too much pressure (if blade breaks when starting cut.)

DULLED TEETH: Speed too high; feed too light; teeth pointing in wrong direction; frame not lifting properly on return stroke; improper blade selected.

CROOKED CUT: Blade too loose; frame out of alignment; feed too heavy; set worn off teeth.

Cure For Hack Saw Troubles Give your men this free 20-page booklet—packed with helpful tips and clear illustrations covering selection, use and care of hand and power blades, frames, and metal cutting hand saws. Includes complete blade selection tables. Ideal for new, inexperienced men; helpful to old-timers as well. To speed work in your shop, write for free copies of "Metal Cutting" today.



Victor Saw Works, Inc., Middletown, N. Y.
Please send me.....copies of "Metal Cutting"
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Company Name
Address

widths, and spliced the 20-inch section into a 42-foot six-ply endless belt which is now serving the drive so urgently needed. The 12-inch section was further slit to provide 112 feet of six-inch, 6-ply belting which is used on smaller drives.

Cost to the paper mill for having the old belt salvaged and made into the types needed was \$36.10. The cost of new belting of a type comparable to that salvaged would have been \$279.00! And more than 80 pounds of crude rubber which would have been needed to make six-ply belting comparable to the salvaged belts were saved for other war uses!

OBITUARY

Fred Feagans, former Purchasing Agent of the Sperry Flour Company, San Francisco, died at that city July 9th. A charter member of the Purchasing Agents Association of Northern California, and president of that organization in its early years, Mr. Feagans had the vision of a National Association of purchasing men and was one of the leaders who made possible the nationwide scope and influence of the present N.A.P.A., which he served as Vice President representing the Pacific Coast district.

Lucien Franck, 87, for nearly thirty years Purchasing Agent of the New York Times and active in that office up to the time of his death, died in New York City, July 2nd.

Charles H. Webb, City Purchasing Agent at Charleston, S. C., since 1935, died at his home in that city July 3rd, after a brief illness.

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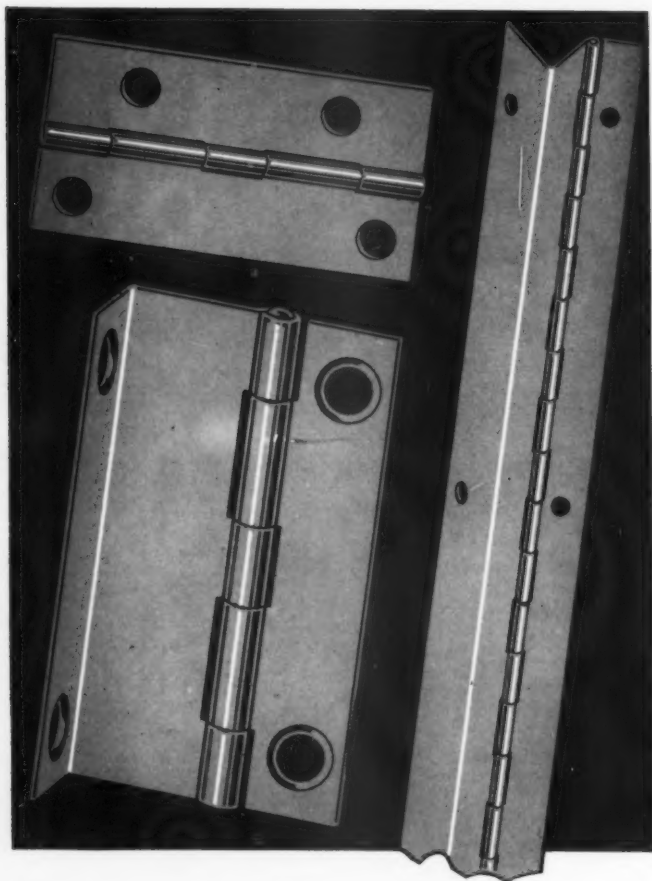
Head and handle are perfectly balanced for easy, accurate swing. Flared end of handle prevents slipping. Head is secured by exclusive Take-Up Wedge kept tight by the turn of a screw driver.

These are reasons to specify Plumb Nail Hammers, for performance and safety, to your mill supply salesman.

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Purchasers' Responsibility for Ceiling Price Compliance

(Continued from page 66)

not readily ascertainable by the buyer. Some regulations establish maximum prices by a formula, which in some instances, may be based on factors entering into the seller's costs. Examples of such regulations are: Revised Price Schedule No. 105 (Gears, Pinions, Sprockets and Speed Reducers); Maximum Price Regulation No. 125 (Non-ferrous Foundry Products); Maximum Price Regulation No. 136 (Machines and Parts); and Maximum Price Regulation No. 149 (Mechanical Rubber Goods). The General Maximum Price Regulation raises somewhat similar problems by establishing maximum prices related to the highest price charged for the commodity, or for the commodity most nearly like it, by the vendor or the vendor's most closely competitive seller. It is the desire of the Office of Price Administration to minimize, within the framework of the Emergency Price Control Act, the difficulties which may impede the orderly and regular purchase of commodities. This is especially important as to commodities which are essential to the war program. Therefore, it is the policy of the Office of Price Administration, where regulations such as these are involved, to require the buyer to exercise good faith and an honest, reasonable judgment. If the buyer has no knowledge or reason to believe that the price paid or to be paid for the product is in excess of the maximum price for such commodity, evidence of his



Here we illustrate a representative selection of PROGRESSIVE special fastenings that are ably serving as vital parts of Uncle Sam's fighting equipment. From gun cleaning implements to ship navigation instruments, PROGRESSIVE products are carrying out their assignments unflinchingly. In making these special headed and threaded parts, rapidly and accurately, PROGRESSIVE finds its 40-year backlog of experience an invaluable asset. When victory is achieved, this same knowledge and skill — enriched by added years of war experience — will be at the disposal of industry for peace-time assignments.

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good faith, to be considered under all the surrounding circumstances including prior dealings with the same or similar vendors, will be afforded by his obtaining a written certification by the vendor that the price of the commodity is not in excess of the maximum price established by the Office of Price Administration. Such a certification may be contained in the contract of sale or invoice or may be a separate document transmitted to the buyer."

1 1 1

RESEARCH FOR VICTORY

● In the mechanized war of today the work of thousands of scientists intensively concerned with its technical problems in one of mass attack, as compared with the light, mobile guerrilla bands of 1917, Lawrence A. Hawkins, executive engineer of the General Electric Research Laboratory said in an address, "Researching for Victory," given before the 174th District Conference of Rotary at Rye, N. Y.

"Some war research workers may at times sigh for the 'good old days,' when initiative was more free and mobility higher," he said. "But it is obvious that the enormous increase in number and complexity of the scientific problems of modern war demands an increased degree of centralized control, if wasteful duplication is to be avoided and each problem is to receive the attention which its urgency demands."

Ample interest on the part of Federal authorities in research is now shown "by a willingness to back research with generous, almost prodigal appropriations," he stated. This, he added, is very different from 1917, when, although the researches of the first World War

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Prevent heat sickness and fatigue in perspiring workers. Full stocks, prompt shipment. Order now.



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Rub on lenses to prevent fogging due to perspiration. Inexpensive. Order a supply.

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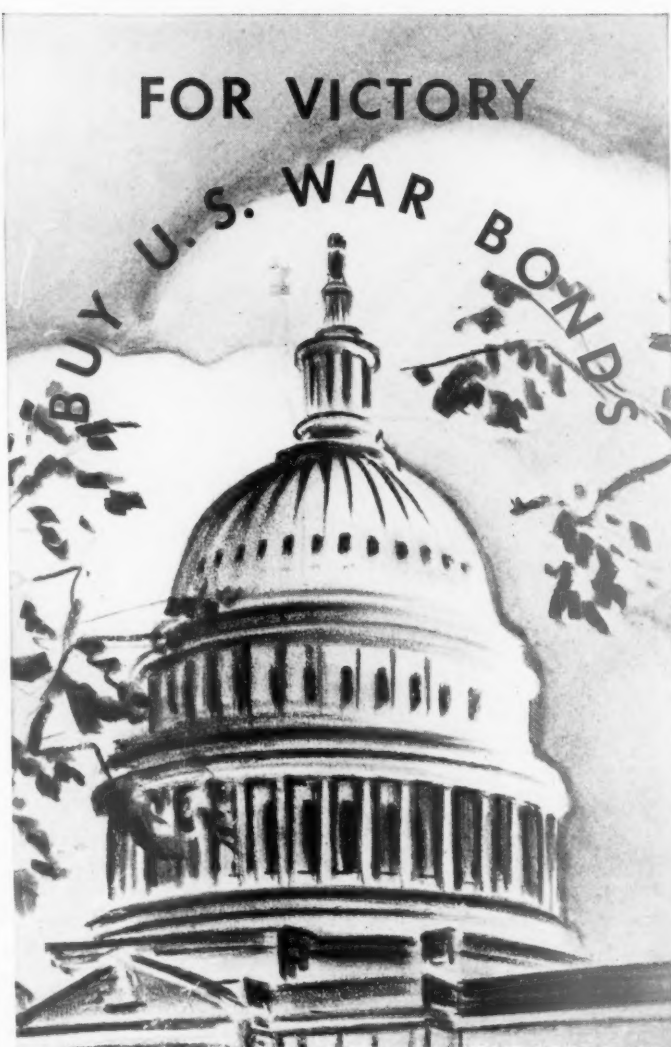


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From past experience industry knows it can rely on Garlock quality for the long, dependable service so vital in today's war effort.

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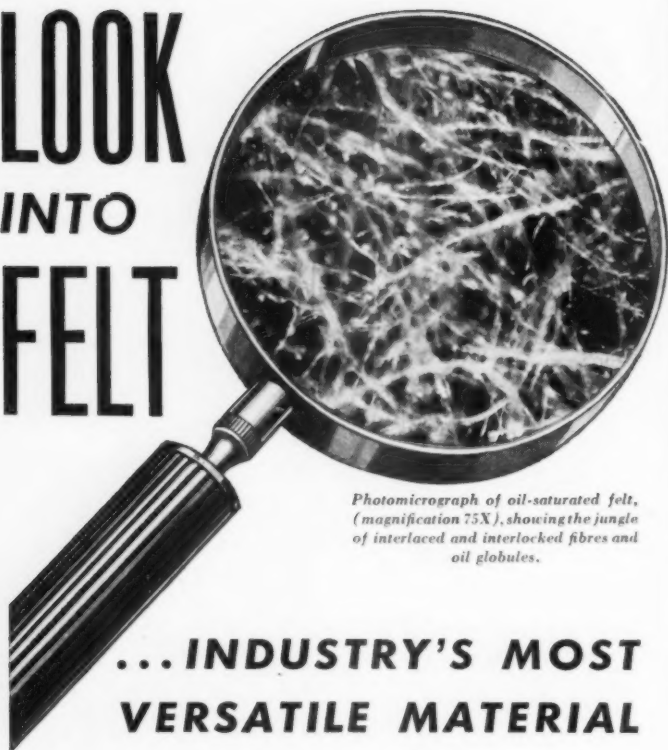
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Felt ranges in thickness from .032" to 3.0"; in weight from 3 oz. to 65 lbs. per sq. yard; the usual width is 72". It can be as soft as a kitten's ear, or hard as maple.

We can make reasonably prompt shipments of Felts which meet all Government Specifications. Data Sheets such as #6, "Felt and Lubrication," #11, "Annular Designing and Dimensioning," and the S.A.E. Catalog, will be sent gladly on request.

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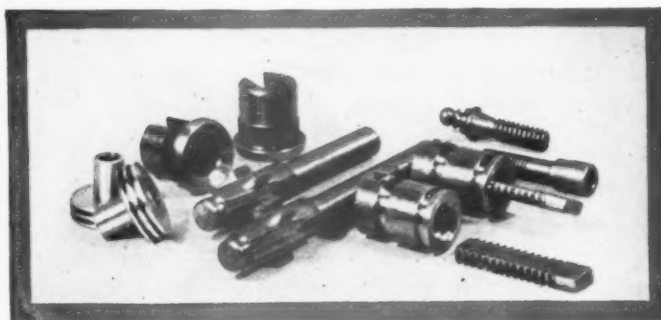
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contributed very materially to the final victory, and the output per man and per dollar was high, much of the research, particularly in the opening months, was at the expense and on the initiative of the relatively few industrial research laboratories then in existence.

Another striking difference between 1917 and 1942 is the part that British scientists are now playing. "British industry took to heart the lessons of the first World War and followed our example, by founding and equipping large industrial research laboratories, and through them creating close ties with university research, which in turn was greatly stimulated by such contacts. In consequence, war in 1939 found science and industry no longer strangers in England, but co-partners in endeavor, already schooled in effective co-operation."

Our large industrial organizations have proved towers of strength in this emergency, he declared, saying that "Research, engineering, and production—those three constitute the great team, achieving for us in peace-time continuous progress to ever higher standards of living and in war-time continuous progress to victory. Such team-work was already the practice in large industrial corporations; thus it was to them that the Army, the Navy, the O.P.M., and the National Defense Research Committee turned, not only to obtain needed supplies, but also for solutions to the technical problems presented by modern highly mechanized war.

"It is no small sacrifice for many a scientist," he continued. "To turn from the alluring search for truth for truth's sake and for the good of mankind, to the development of instruments of destruction, may mean a painful dislocation of deep-seated incentives. But sacrifice is the common lot of all in war, and the



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High precision, difficult cuts, refractory metals—for years these have been Newton's daily fare! As a result, Newton-made screw machine parts have been "standard requirement" in thousands of nationally known appliances, instruments, machines.

To be able to apply this schooling to war production is a distinct privilege. It is also an inspiration. For out of this unremitting drive must come new methods, new products that will mean savings in peace times to come for users of Newton-made parts.

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Your local Allen Distributor will secure for you the largest shipments compatible with your priorities and our intensified production-effort.

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At many a "somewhere in the U. S. A.", Watson-Stillman Straightening Presses are putting the finishing touches on machine gun barrels—more quickly, more accurately than ever before.

Meanwhile, scores of other plants are finding new uses for these versatile presses—straightening all kinds of rods, bars, tubes and structurals. For these units are available in many capacities—with and without movable work tables—equipped or not equipped with ceters, rollers and other accessories. But, whatever the adaptation, all are conspicuous for their high speed operation, extremely sensitive control, and design refinements that only W-S hydraulic engineering experience and skill can provide.

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scientist has a special compensation in his knowledge that his war effort, beyond its primary and all-important purpose of contributing to victory over the enemy, will in all likelihood yield things of great value when peace returns.

"It is not only that many of the new plastics, alloys, synthetic rubbers, and other materials developed under the pressure of war needs, will find their peacetime uses, nor that the opening of new fields through war projects, such as that of radio micro-waves, reveals vistas of important peace-time developments, but that new things, now unpredictable, will spring from the war efforts."

As an illustration of this, he recalled that never "when in 1917 we were designing, developing, and manufacturing transmitting tubes for use in that novel communication method called wireless telephony, did we foresee that we were shaping the cornerstone for the central building of a great new industry, the radio broadcasting station."

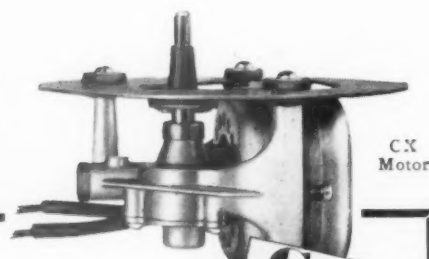
Technical men alone cannot do the whole job, Mr. Hawkins said. "If a big engineering installation develops serious trouble from a mysterious cause, research may step in, trace the disturbance to its source, and show how it may be eliminated, but if the engineers do not utilize the new knowledge, the trouble remains, and nothing useful has been accomplished."

"So when American research, engineering, and production have provided all needful weapons for victory, thus placing it in the power of the Allied Nations to establish a basis of lasting peace, there will remain the question whether they will wisely use that power, or whether, as in World War I, we shall win the war and lose the peace."

Instead, he concluded, "we should finish the job,

Ⓖ SMALL-POWER MOTORS

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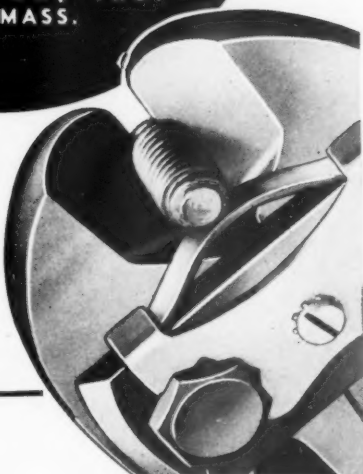
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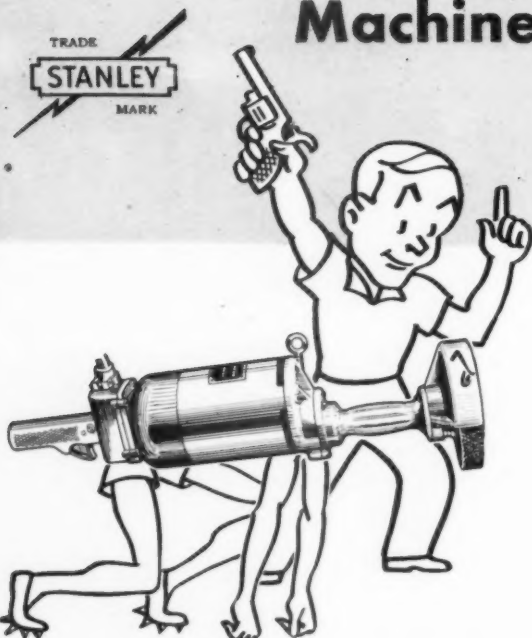
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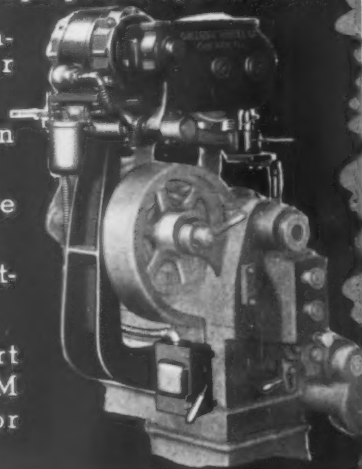
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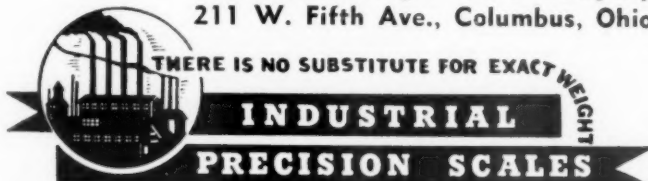


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In addition to the main alphabetical listing, there are cross-indexing lists by cities and by commodities concerned, a list of secretaries; and much supplementary material such as the relative size of major industries in the United States, and the number of factories, retail stores, farms, and service establishments in each state. The compilation has been made under the direction of C. J. Judkins, Chief of the Trade Association Section, Commerce Department.

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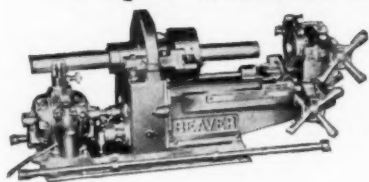
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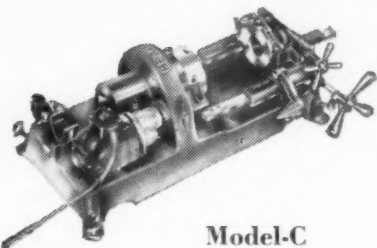


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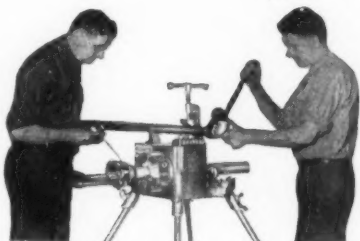
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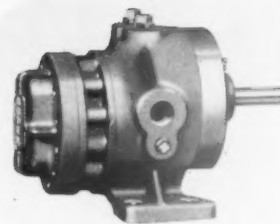
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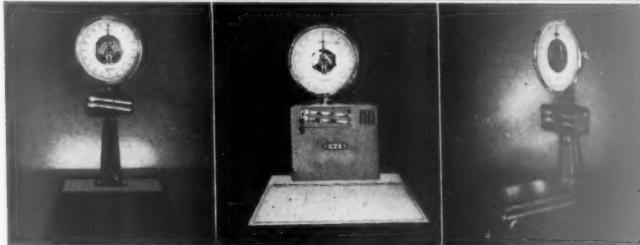
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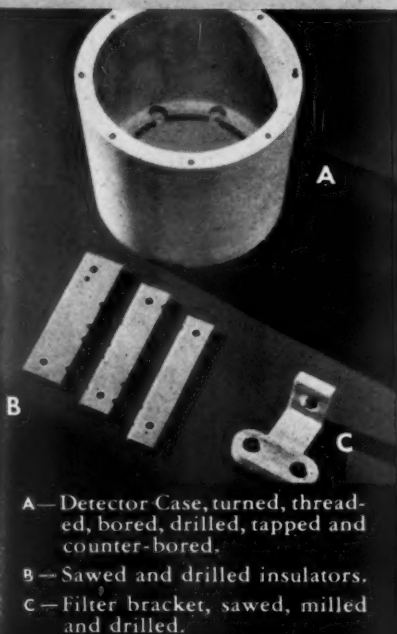
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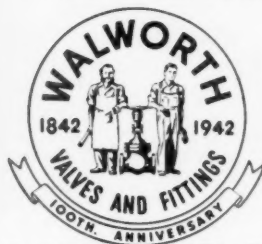
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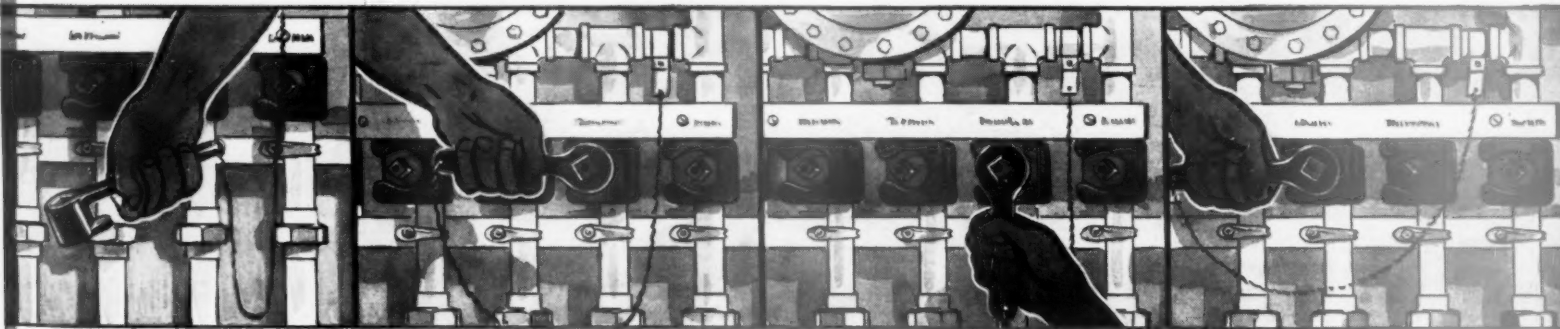
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